The New York State

Conservationist

State of New York Conservation Department *December 1957—January 1958*

RING-BILLED GULL
Larus delawarensis
(*See page 16*)

Out of this world

One day this Fall we were born into a new era—The Age of Space. It was quite a jolt, since not we but the Russians performed the operation that shot a man-made moon hundreds of miles through the earth's atmospheric envelope and released it to spin around us in precise orbit.

But no matter who lit the fuse, we're all, in effect, riding on that satellite. Whether we like it or not, we've got both feet off the ground. We're going to have to learn to live in and master a new dimension—space.

There's no doubt that we can do it. It's only the most recent in a long series of challenges that we've created, met successfully and built upon in the progress of civilization. Fire, for instance. With what fear that must have been regarded! Yet man made it serve his will and released himself thereby from darkness and cold. The wheel—a great technological breakthrough; the plow—an implement that changed the way of life for our nomadic ancestors. The harnessing of steam and the invention of the internal combustion engine that battered down the walls of the feudal system; ushered in the Industrial Revolution. The taming of electricity; the development of radio; the testing at Kitty Hawk of an improbable contraption that actually flew; the trained vision of a man named Einstein whose deceptively simple formula, $E=MC^2$, set off a chain reaction in the minds of physicists that resulted in the harnessing of atomic power.

And today — satellites — "Sputniks", "Vanguards" or what have you. Tomorrow—space platforms, interplanetary travel, exploration of the Universe. Who can doubt it?

But there is a key to all of this; a common denominator of progress reaching back through the ages to the prehistoric capture of fire and stretching ahead into the future of space. That common denominator is our natural resources. From our origin to our ultimate destiny we are of the earth. Every advance we have made has been paid for from these resources—the organic reserves of the soil; from water and timber, from minerals, coal and petroleum.

It behooves us in our race into space to give thought to what we are; to the source of our strength. Unless we do so; unless we use these natural resources more wisely than in the past we may be truly—*out of this world.* —EDITOR

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DECEMBER-JANUARY, 1957-58

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The Conservationist is an official publication of the N.Y.S. Conservation Dept., published every two months at the Department's offices, Arcade Bldg., Albany, N. Y. No advertising accepted. Subscription rate $2.00 per year. Entered as Second Class matter July 24, 1946 at the Post Office at Albany, N. Y. under Act of March 3, 1879. Printed in U. S. A.

What Do Owls Eat — How?

by LeRoy C. Stegeman,
State University College of Forestry at Syracuse University

Most of us fancy ourselves as pretty good detectives. We like to assemble the evidence, examine the clues and figure out "who dunit." And why not? It makes the world around us more interesting. That's especially true of the world of Nature. The creatures of the wild are more than ever fascinating when we examine the evidence before our eyes; look for clues that will tell us more about how they live, how they hunt for their food, what they catch—or fail to catch.

Let's take, for instance, the case of the great horned owl and the cottontail rabbit as depicted on the front cover of this issue. The owl has just missed a rabbit dinner—thanks to a handy rail fence—and before he brakes to a stop he will probably wind up leaving the impression of his body and outstretched wings in the snow—clear evidence of a moment in the lives of two wild creatures.

Owls are especially good subjects for nature sleuths because of their habit of regurgitating undigested remnants of their prey in pellet form. These are wonderful clues for wildlife detectives to study, as you will learn from the accompanying article.—Editor

IT is always exciting to solve a mystery and the mysterious ways of the wise old owl, who operates in darkness, are a real challenge. Owls are chiefly night hunters and you could not very well watch their activities even if you knew where and when they were hunting. This being true, how can you find out what they have been feeding upon? Find their roost or nest and the information will be available.

Owls swallow much of their prey whole and therefore bones, hair, feathers and such undigestible parts reach the stomach. Owls keep this material in the stomach until the digestible parts are extracted. The remainder is then formed into balls called "pellets" that are regurgitated near their nesting and roosting areas. If you look on the ground under these nests and roosts you will find many pellets since one or more are formed every day. *Figure 1* will give you some idea of what they look like.

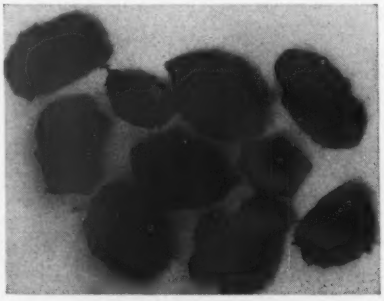


Fig. 1. Owl pellets

Fig. 2. Four kinds of skulls

At first, they look like balls of grey or brown fur. On closer inspection, however, many bones and parts of skulls can be seen. You will find it fun to be a detective and as you break these clean, odorless pellets apart, the bones will tell you the kinds of animals that have been eaten.

Many of the bones are still entire and since each kind of animal has bones of different size and shape, you can tell what animals are represented.

The skulls are easy to identify. Many of them are complete enough to show distinctive characters. *Figure 2* shows four different kinds of skulls taken from barn owl pellets.

The general form and structure differs greatly. Naming these, from left to right, they are: Bird, mouse, shrew and mole. Birds have no teeth; just a horny beak. Mice have a heavy wide skull and the two front teeth (incisors) of both jaws are very large and chisel shaped for gnawing. Both the shrews and moles have long pointed skulls and sharp pointed teeth called "insectivorous teeth." These are well suited for piercing and crushing the hard shells of insects. Those of the shrew are brown at the tips and crowns while the teeth of the mole are very white. The mole is a much larger animal so the skull is larger.

Figure 3 shows both the skulls and lower jaws for four kinds of animals. Naming these, from left to right, they are: Meadow mouse, deer mouse, shrew and mole. The two kinds of mice can be told apart by size; the meadow mouse being much larger, and by the kind of grinding teeth near the back of the jaws. In the meadow mouse the teeth are very large with flat surfaces for grinding, while in the deer mouse the teeth on both the upper and lower jaws are smaller and the surface bumpy or cusped for crushing the food. The lower jaw of the shrew is heavy with brown-tipped points and surfaces on the teeth, while the lower jaw of the mole is very slender and long with white-pointed teeth.

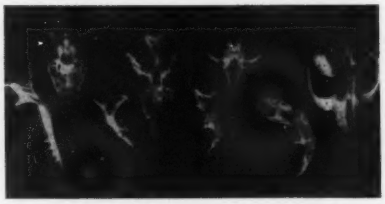


Fig. 3. Skulls and lower jaws

Still finer details enable a specialist to determine the species of shrew, mole or mouse in the sample. The same is true for bird skulls. There are different sizes and shapes of bill, etc. to tell the species apart. The one shown in *Figure 2* and *Figure 5* is a sparrow with a heavy seed-eating bill.

Other parts of the skelton show just as much difference but we need not bother with the smaller bones. The long bones of the legs are easily recognized and they also will help you. *Figure 4* shows the humerus from the upper wing.

Fig. 4. Bones from upper wing or foreleg

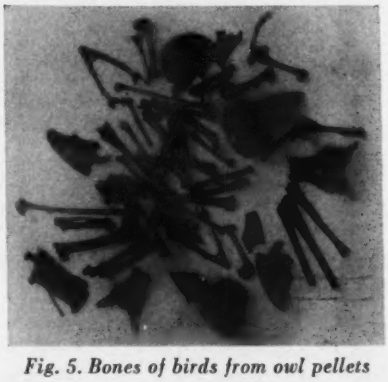


Fig. 5. Bones of birds from owl pellets

Naming the animals represented, from left to right, they are: Bird, mouse, mole and shrew. The humerus of the bird is enlarged at each end for the attachment of the powerful and large flight muscles. They are also long to increase the size of the wing and hollow for lightness in flight. The humerus of the meadow mouse has well developed processes at the ends for the strong joints indicative of a running animal. The humerus of the mole is very heavy and powerful with large joint development for great strength. Moles live under the surface of the ground and dig their burrows with their powerful front feet. The humerus of the shrew also is quite strong and somewhat bowed since the shrew's legs are short and bowed. It is small enough to permit them to run freely through the mouse and mole runways.

The bones of birds are quite different from the bones of mammals. *Figure 5* shows a collection of bird bones taken from barn owl pellets.

Both skulls, lower jaws and beaks are shown. The short conical beaks indicate seed-eaters of about sparrow size. The back or pelvis consists of several fused bones.

The humerus, previously mentioned, and other long bones are from the wings and legs and have wide ends for large joints and surfaces for muscle attachment.

The breast bones have a high central keel or ridge for the attachment of the powerful flight muscles of the breast.

Figures 6, 7, 8 and *9* show collections of bones taken from barn owl pellets and representing different animals as indicated in the titles. These will show some of the variations to be expected for each kind of animal.

The bones of the meadow mouse, our largest mouse, are quite heavy. Most of the skulls have the brain case either crushed or missing. The racket-shaped bones are the pelvic bones which are used to determine sex, as described later.

The teeth have flat grinding surfaces and are set in deep trenches (sockets) in the jaws. Even though the teeth are missing, the deep sockets show it to be a meadow mouse. This kind of tooth continues to grow throughout the life of the animal.

The bones of deer mice are much smaller and more delicate than those of the meadow mice. The teeth are different in type, having bumpy or cusped surfaces and they do not grow after they are first formed. In case the teeth are missing, the jaws will have small holes where the slender roots were inserted into the jaw. This is quite different from the trenches for the teeth of meadow mice.

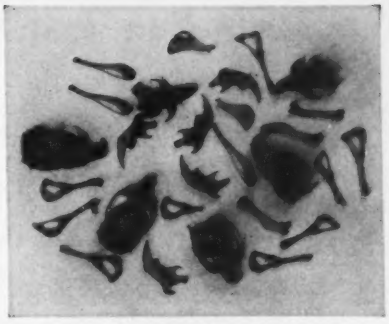


Fig. 6. Bones of meadow mice

Fig. 7. Bones of white-footed deer mice

Fig. 8. Bones of short-tailed shrews

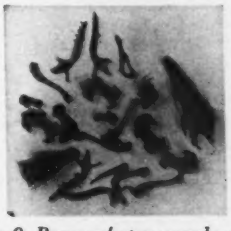


Fig. 9. Bones of star-nosed moles

Shrews have very short legs with heavy bones for additional strength. Skulls are long and heavy boned.

Their teeth have long dark brown sharp points adapted for feeding on insects.

The skulls of star-nosed moles are long, slender, and much larger than those of shrews.

The teeth are insectivorous (sharp-pointed) in type and their food consists primarily of insects and worms.

The leg bones are very short and heavy to provide sufficient strength for burrowing in the ground.

Figure 10 shows you the basis for determining the relative age of the prey.

The bones are those of meadow mice. The length and heft of the bones increase with the age of the animal. For each of the kinds of bone shown, the age decreases from left to right. In young animals, the digestive action in the owls separates the ends of the long bones from the shank while in old animals the ends remain attached. Thus, by carefully comparing the bones the story of relative age is revealed.

In certain animals you can go still farther and tell what sex is represented.

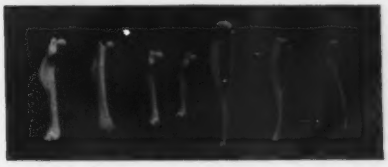


Fig. 10. Bones showing age variation

Figure 11 shows the difference in the hip bones (inominate) or pelvis, of the male and female meadow mouse. Those of the male are shown on the left, while those of the female are shown on the right. These samples also were chosen to show the change in size and heft with age.

Thus, by keeping these few points in mind, you can tell, not only what an owl has been eating, but something of the ages and sexes of some of the species. I hope you will break apart the next owl pellet you find and see what animals are represented. You do not have to be an expert to get the thrill of discovery.

Fig. 11. Bones showing sex differences

To test your ability, examine *Figure 12*, which shows the bones taken from a single short-eared owl pellet. What animals had the owl eaten? What ages and sexes were represented? For the answer, see page 39.

And, you will find it is more fun to *know* than to accept the prejudiced claims of those who no not know but who issue blanket condemnations of all owls as killers of poultry and game. It's true, as you'll find from the pellet clues, that some individuals of the larger species of owls take rabbits, grouse, pheasants,

(Continued on page 39)

Oneida Fish and Game Club

A Central New York Group of Sportsmen Combine Conservation and Civic Spirit to Create an Outstanding Community Program

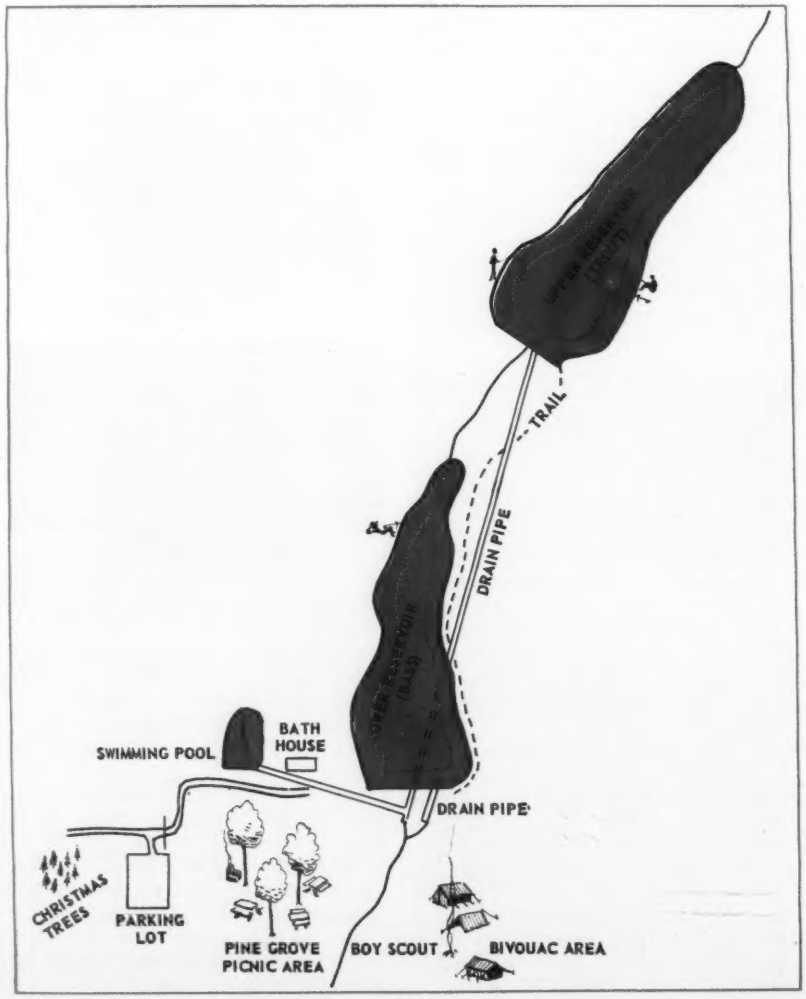
Fish and game clubs in search of sound program objectives often have difficulty in conceiving and agreeing upon constructive conservation activities. And even when these difficulties have been hurdled, a maze of operational troubles may still stall accomplishment.

The project described below was given unusual impetus by a combination of favorable terrain and circumstances. But clearly, club projects may be of varied type and scope. We are convinced that worthwhile opportunities are available to most clubs and that the project of the Oneida Fish and Game Club described below illustrates that, with foresight, initiative and sweat—a great deal can be done.—Editor

WE usually think of a fish and game club as a group of outdoor-minded men who are banded together to promote and aid one or more phases of fish and wildlife conservation—and who want to have some fun doing it. Unfortunately, many clubs never get beyond the armchair stage with their plans. And once in motion, they often fall short in accomplishing the objectives set. Fortunately though, an increasing number of sportsmen's organizations are developing broad vision—looking for and finding opportunities that lie at hand for comprehensive conservation programs in their own communities—and doing something about it. We have had the good fortune to work closely with such a group, the Oneida Fish and Game Club, and it's a happy task to report their accomplishments to date.

In 1947 the club took a 50-year lease on a tract of land owned by the City of Oneida and on which are located the sites of two water reservoirs. The reservoirs had not been in use since 1926 and from that time the entire area had lain idle. The club envisioned its tremendous potentialities for development as a conservation area and in 1952 the initial plans were made and work was begun. The reservoir sites are located in a narrow valley and the surrounding land is well wooded, as is usually the case around water-supply reservoirs. This situation made it a "natural" for development as a fish and wildlife preserve. The reservoirs, which at one time supplied Oneida with water, have a system of pipes and valves that make it possible to drain either one separately or both of them together as may be required. This is truly a fishery biologist's dream, for management of fish in a particular body of water often depends on juggling the fish population around so that the desirable species will be aided and the rough fish controlled. Such changes in fish populations can rarely be brought about in natural lakes because of physical conditions or social problems.

The club members, led by their energetic officers, took on the task of clearing the lower reservoir site of trees and brush that had grown up during the period of disuse when it did not contain water. Nearby farmer-landowners brought chain saws and axes and pitched in to help clear the site. It was necessary to do this work to prevent oxygen depletion and an acid condition of the water upon refilling the reservoir. Entanglement of fishing lines was also a consideration.



Project

Meanwhile other club members went about the task of putting into operating order the numerous valves and pipes that make possible draining and adjustment of water level. Hundreds of food-bearing shrubs for wildlife obtained from the Conservation Department were planted on the slopes surrounding the reservoirs. Thousands of young evergreen trees, destined at some future time to gladden hearts at Christmas time, were planted on the open land.

With new ideas for additional development and expanded activities on the area came the problem of access for heavy equipment. This proved to be a temporary obstacle since a farmer with adjoining property donated the necessary land. The road was quickly built through the co-operation of local public agencies with the necessary road building equipment. This made it possible to haul in lumber, cement, sand and other materials to be used in developing picnic areas. Fireplaces and picnic tables were constructed and now a family on an outing can choose the pine grove below the lower reservoir or the table area immediately adjacent to this reservoir for their picnic spot.

Club members were divided as to the type of fishing desired, some wanted trout while others preferred bullheads, bass and other warm-water fish. Ordinarily it is impossible to please everyone, but the millennium was approached here for, as previously noted, this is not an ordinary situation. Department fisheries personnel reclaimed the upper reservoir and stocked it with trout while the lower reservoir was stocked with bass, bullheads and pickerel.

A common problem in many of our lakes with warm-water fish populations is that of overpopulation with rough fish and forage species. In an attempt to produce a better balance between the game and forage species, in this impoundment, the game fish were stocked first after which the forage species were introduced. Very often a large percentage of the forage fish grow too large for utilization by the game species. In order to forestall the occurrence of this situation, the bluntnose minnow was introduced and has now become well established. This minnow is prolific but even when maturity is attained it seldom exceeds four inches in length. Brook trout up to 18 inches in length have been taken while the warm-water fishermen have begun cropping the bullheads and pickerel. The smallmouth bass have not, as yet,

Lower reservoir is managed for warm-water game and panfish

The upper reservoir is managed for trout

One of the area's picnicking sites

The Club's and the City's pride — the new swimming pool

Construction was started this year on Boy Scout's bivouac area

had time to attain their legal size.

In 1956 the club undertook its most ambitious segment of the project. Plans were drawn up for a swimming pool and bath house. The City of Oneida had no facilities for community swimming and the construction of a pool seemed to be a worthwhile undertaking. The terrain near the dam of the lower reservoir was well suited to the construction of a pool. Local people again joined with the club members in clearing the pool site of trees and brush. A pool basin, 300 by 150 feet with a maximum depth of 12 feet, was excavated and the bottom was lined with soil cement. The pipe from the upper reservoir was tapped and a connecting line was laid to the pool to supply it with water. A diving dock was built at the pool and a combination bathhouse and refreshments stand was constructed nearby. Although the total cost to the club for this part of the project was $12,900 an engineer's estimate placed the probable cost, had the job been contracted, at $100,000. The low cost of this work was due to the location of the pool site, the many hours of volunteer labor, the purchasing of much of the material at cost and the availability of State, county and city equipment. Funds for the entire operation were raised by public donation. From the time the first earth was moved in June, the swimming pool project was rushed until the day of dedication on August 11. The swimming pool was turned over to the City of Oneida in June, 1957. The pool is staffed with life guards and swimming instructors and facilities are now adequate to handle hundreds of bathers daily including bus loads of children in Oneida's youth programs.

The club's current undertaking is the construction of tent platforms below the lower reservoir dam. This will provide a bivouac area for Boy Scouts. Possibilities for additional development of the area are unlimited and undoubtedly the club will take action on new ideas when time permits.

It should be pointed out that the many facilities now available as a result of this ambitious project are not restricted to any one group and no fee is charged for their use. The wholly unselfish motives of the club in carrying out this project are certainly commendable. They have already received recognition from several sources including a citation from the National Recreation Association. This was for outstanding contribution to the recreation movement in America in 1956. Other fish and game clubs would do well to take a cue from the Oneida Fish and Game Club in planning a program of action.

—A. C. PETTY,
District Fisheries Manager

Poison Ivy and Wildlife

by Richard Headstrom

AS I ramble about the countryside, especially during the Summertime, I often think that the outdoors would be far more enjoyable if we did not always have to keep an eye open for poison ivy, lest we come in contact with it and suffer from its toxic properties. Even in urban areas we have to be on guard for it occurs in the most unexpected places. And let no one tell you that he is immune. Recent investigations have shown that we are all susceptible in varying degrees and that the extent to which we may become poisoned would seem to depend on our condition, the condition of the plant, and the circumstances under which we are exposed to it. So it is advisable to avoid contact with it for though we may escape with but a minor irritation one time we may not be so fortunate the next.

Be that as it may the plant is a nuisance as far as we are concerned and if we are inclined to question its value in the over all scheme of things perhaps we may be excused for doing so. But I doubt that Nature created anything without some purpose in mind; as for the poison ivy it may surprise you to learn that it has considerable value as a food plant for our wildlife, far more, indeed, than you may suspect.

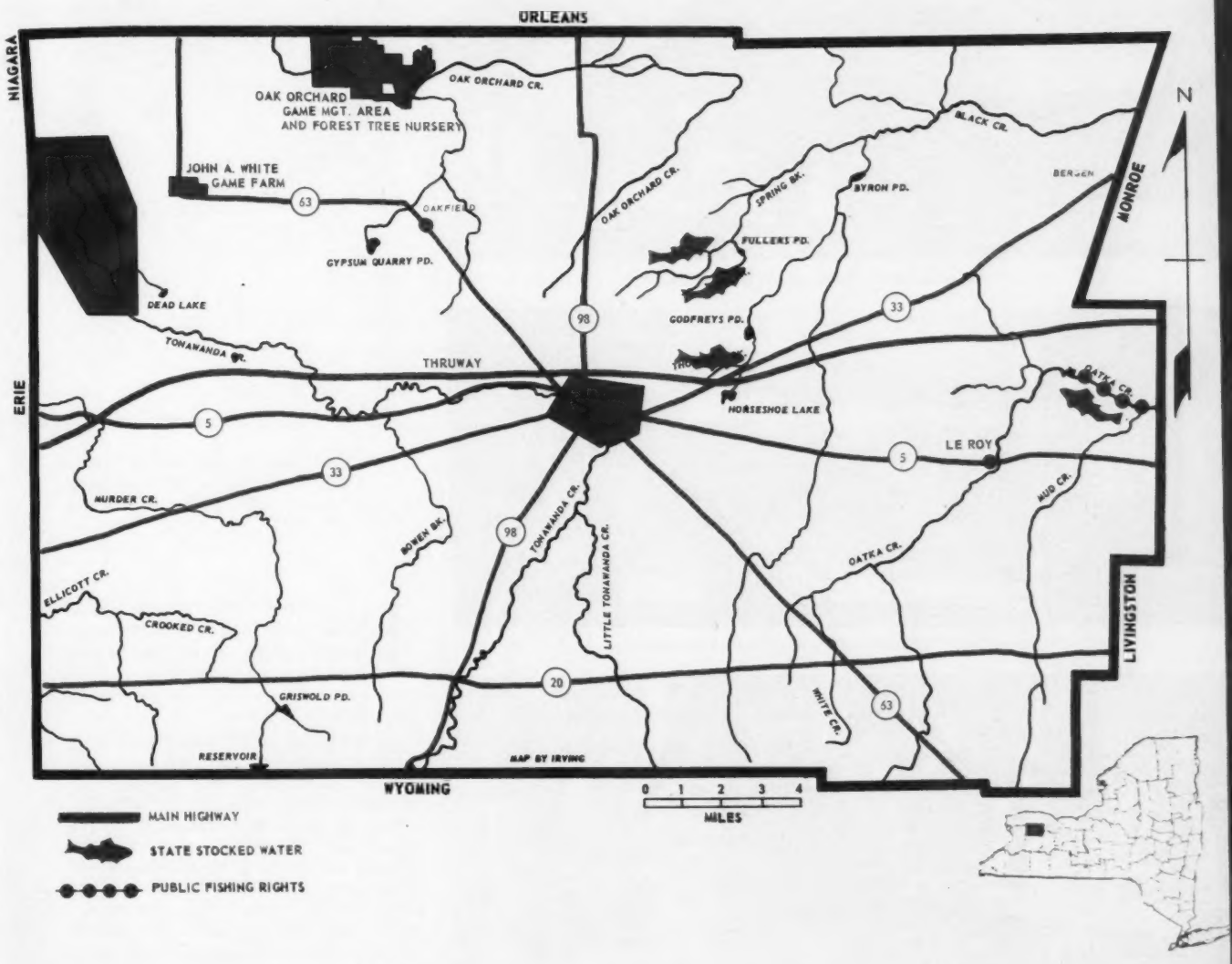
The poison ivy, as we know it, is a three-leaved shrub which often assumes a vinelike habit, when it may either trail over the ground or climb about a fence, wall, or tree. Frequently the name is applied to several other related shrubs, one of which is found in the Southeast and the other on the Pacific coast and which are more appropriately known as poison oak. All three of these plants, as well as the poison sumac with which they are closely allied, are equally popular with our wildlife, if unpopular with us.

The poison ivy ranks high among our woody plants as a wildlife food plant. Some 55 species of birds are known to feed on the seeds and six species of mammals on the leaves, stems and seeds. That such a large number of different birds eat the seeds may lead one to think that they are preferred to those of other plants. This is not so for they are generally left alone, when others may be had, and are eaten primarily during the Winter when other foods become scarce. And herein lies the value of the plant. The seeds are a wise provision of Mother Nature to guard against a period of scarcity and often prove to be a means of survival.

Of our mammals, the pocket mouse, which is almost exclusively a seed eater, subsists to a large extent on the fruit of the poison oak during Fall and Winter. The mouse is also known to feed on the leaves of the plant. The wood rat in California is known to eat both the seeds and leaves and stomach analysis of the muskrat has revealed that this rodent, too, eats the seeds of both the poison ivy and poison oak, whichever occurs within its range. Mearn's cottontail occasionally eats the leaves, stems, and seeds of the poison ivy and the black bear is known to do the same. In the West the mule deer browses on the foliage and twigs when more appetizing food is not available.

That the poison ivy and its relatives, which we view as a nuisance, are not regarded in the same vein by our wildlife is quite apparent. Doubtless further researches will show that other birds and mammals also make use of these plants and that they are even more important to the welfare of our wildlife than we already know them to be.

Genesee County



Conservation Department Offices

District Forester	335 E. 3rd St., Jamestown
District Game Manager	2130 Scottsville Rd., Scottsville
District Fisheries Manager	2130 Scottsville Rd., Scottsville
District Game Protector	304 State Office Bldg., Buffalo

Farm Service Offices

Genesee Co. Soil Cons. Dist.	420 E. Main St., Batavia
Genesee Co. Agri. Agent	420 E. Main St., Batavia

—Roy Irving

A New Institution Dedicated to an Old Way of Life

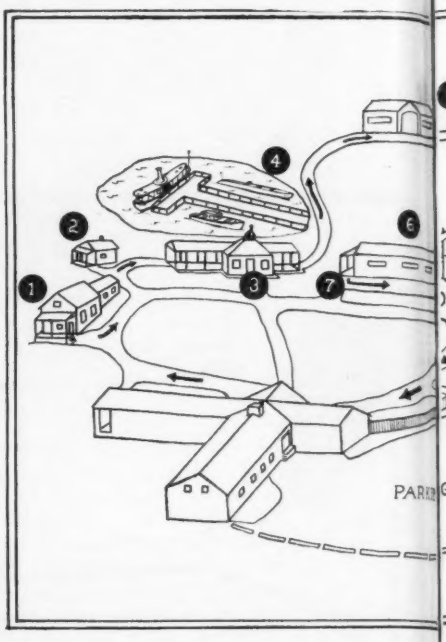
Adirondack Museum

Main buliding of Adirondack Museum

View of Blue Mt. Lake from main building entrance

Relief map of region in foyer

Right gallery houses dioramas



1. Log cabin. 2. Adirondack cottage. 3. Railroad station. 4. Boat pond. 5. Vehicle buildings. 6. Logging

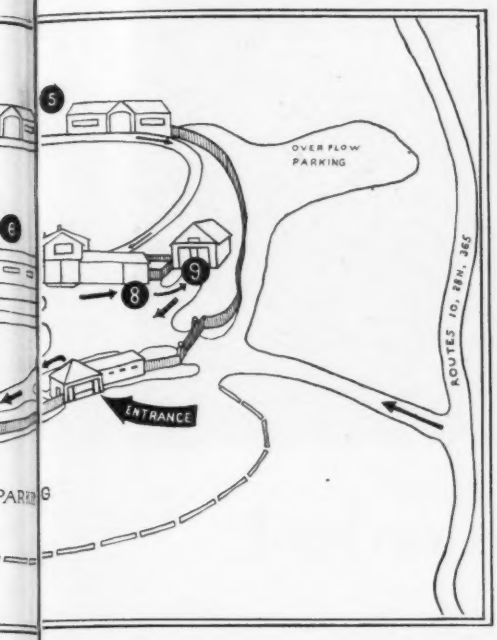
BLUE MOUNTAIN LAKE, one of the most beautiful and scenic areas of the whole Adirondacks, became the home this year of something new, yet very old—the Adirondack Museum.

Operated as a State-chartered, nonprofit institution by the Adirondack Historical Association, the museum was formally dedicated on August 3 by Dr. Albert B. Corey, State Historian for the Education Department and formally opened by Harold K. Hochschild, President of the Adirondack Historical Association.

The museum's theme is the relationship of man to the Adirondacks and it has been meticulously depicted throughout the campus that comprises the museum's twenty-five acres. The main building of field stone is located on the site of the old Blue Mountain House, a mile from Blue Mountain Village near the convergence of routes 10, 28 and 365.

At the entrance to the main building is a cross section of a 240-year-old tree on which are marked historical events in the Adirondacks and elsewhere. In the entrance hall is a large relief map of the area, on which, by pushing buttons, the

in the Adirondacks



equipment. 7. Longhouse. 8. Stoves. 9. Guide-boats. Main building is to left of the entrance to campus

visitor may turn on lights that indicate the location of the towns, rivers, mountains and lakes in that area of the Adirondacks.

The gallery to the left contains period photographs, drawings and paintings. The gallery to the right houses a series of dioramas illustrating early logging techniques, historical events and ways of life in the Adirondacks. Plug in an earphone and one gets a brief talk on the diorama being viewed. Gaze out the big window in the right gallery end and there's an unsurpassed view of Blue, Eagle and Utowana lakes. Follow the arrows in numerical sequence on leaving the main building and one visits the other buildings shown in the accompanying layout.

In his address Dr. Corey expressed "the wish and hope of everyone present and of the Board of Regents who chartered the Adirondack Historical Association, that this museum may long continue to tell the story of the Adirondacks." We join Dr. Corey, wholeheartedly, in that hope. —ROLAND B. MILLER

Some 20,000 visited the museum this year before it closed September 15 for the Winter.

Porcupines vs. Trees

IN an article appearing in THE CONSERVATIONIST back in 1948 the porcupine was labeled as vacation hazard No. 2, among other things. In this same article it was brought out that highway accidents, human interference and a low birth rate (one young per year) keep the porcupine from becoming unduly numerous except in specific locations.

Now, eight years later, we apparently have one of these specific locations—in this case Forest District No. 6 which comprises Jefferson, Lewis and Oswego counties. Part of a Forester's duties is to watch over and manage the natural woodlands and plantations which make up our State Forests. The porcupines' dietary habits are not making the job any easier and in some sections, including District No. 6 they are becoming a serious problem—especially in plantations.

The trouble with porcupines can be laid to their hearty appetite for the soft inner bark of most trees, for the needles of hemlock and the buds of elm. To reach this thin layer of soft inner bark they chip off large areas of the outer bark with their chisel teeth, and inevitably the tree is badly wounded and usually completely girdled and killed. Where there are heavy local concentrations, nearly 100 per cent of the trees may be killed in areas up to several acres, depending on the number of animals present. Concentrations usually occur where there are particularly advantageous denning places such as rock ledges, old abandoned buildings and heavy windfalls.

We understand that in the State of Washington porcupine damage to forests has become so extensive that a porcupine control committee has been organized by Federal, state and private forestry officials. It has been estimated that out in that part of the country a single porcupine in his lifetime destroys $6,000 worth of timber. Hunters in that state are now competing for rifles, pistols, cameras and other prizes offered by the committee in a contest to help control the porkies.

Any forest tree, except soft or red maple, may be eaten. However, the porcupines have their preferences and these vary according to the season of the year. In the Winter, hemlock seems to be a favorite, followed by Scotch pine, larch, balsam, Norway spruce, white pine, red spruce, red pine and, very rarely, white spruce. In the Spring they show a strong preference for elm buds and sugar maple bark. Also in the Spring they forget their usual nocturnal habits and get out in the sunshine to bask and eat. These two facts put together, expose the porcupines' Achilles heel. They can be spotted easily from a considerable distance in the bare branches of elm and maple. In March, April and May of 1956, 123 were killed on State Forests in District 6. Only 25 more were killed during the rest of the year. Fifteen of these were trapped in one location near a den in an abandoned schoolhouse.

Trapping is a good method of reducing porcupine populations, especially in Winter in their well-travelled trails in the snow. Difficulties with trapping are the necessity of daily trips to visit the traps and the inaccessibility of some areas because of snow.

Hunters are reluctant to shoot porcupines for fear their dogs may become agonized pin cushions, or because they don't want to frighten away other game. Many people mistakenly think porcupines are protected. This idea stems from an old woodsmen's code protecting porcupines because "if a man is lost in the woods, it is the only animal he can catch and kill with a club to provide food for himself." However, conditions are not what they used to be, and it is very doubtful if today's lost people would find it necessary to hunt down, kill and eat a porcupine.

Besides killing trees, the porcupine has some other bad habits. He will go into a camp and devour everything but the iron stove. Anything and everything with a trace of salt goes first—axe handles, for instance, tables, chairs, etc. Unlikely as it may seem, he is fond of automobile and truck tires and, if given the opportunity, will eat them down to the steel mesh.

We don't advocate, much less anticipate, the extermination of the porcupine. He is part of our woods environment and, as such, is entitled to his place. We would, though, like to see his numbers reduced to a point where his destructiveness to commercial timber can be curbed yet be present still as one of our most interesting native species. Perhaps this is about where he stood when his natural enemy, the fisher, was present in sufficient numbers to keep him in check.

—A. W. ROBERTS, JR., *Forester*

Do It Yourself Weed Control

DOES your lake have too many weeds? If overabundant aquatic vegetation makes boating and fishing difficult and swimming uncomfortable or dangerous you can do something about it. You shouldn't wait for someone else to "bail you out." Do it yourself!

At Findley Lake a group of ambitious and public-spirited citizens have done just that. Nine local residents formed a weed control committee and tackled a major weed problem with very satisfactory results. Two years ('56 and '57) of successful efforts on the part of this volunteer group shows that the "do it yourself" approach can succeed. The following account of their activities is a tribute to their self-sufficiency, and, possibly, a guide to other lake residents with a weed problem:

Findley Lake is located in the Allegany River drainage on the western edge of Chautauqua County. It was formed by damming the outlet of two small ponds in a swamp. This made a shallow lake covering an area of 275 acres. It is rich in nutrients producing an abundance of many species of fish, including muskelonge, but unfortunately much of this nutrient wealth has gone into an overabundance of submersed aquatic vegetation. Nearly 85 per cent of Findley Lake has been densely weeded. Fishing, boating, water-skiing, and swimming were difficult and in some parts of the lake impossible. There was an overabundance of small forage fish which would have better served their role in Nature's scheme if they hadn't been so well protected by the dense weeds. Some lake shore property was for sale because the owners no longer could enjoy the use of the lake.

Over the years, a number of ineffective methods of weed control had been tried. These included lowering the lake level as much as sixty inches during the Winter and, one year, spreading a chlorine compound on the exposed lake bottom. These efforts had no apparent effect on the weeds but may well have been responsible for the large numbers of dead fish found after the ice went out.

With the local citizenry aroused, desperate constructive action was needed. Several men volunteered to form a weed control committee. A meeting was held in the fire hall in Findley Lake, the village at the foot of the lake, in the Fall of 1955. At this meeting the weed committee plus other active members of the community were told about chemical weed control by a New York State Conservation Department biologist. This information, plus cost data supplied by representatives of a chemical manufacturer, encouraged the committee to proceed with a sodium arsenite weed control program for Findley Lake.

A general public meeting was then held to inform the community of the project being planned. In addition, informative letters were sent to all residents of the area and to non-resident property owners. A fund raising campaign was generated. This whole program was of necessity a completely locally financed, voluntary contribution arrangement.

Committee meetings were held frequently to expedite fund raising, planning and the purchase of equipment. The State Health Department* was informed of plans and their representative attended some meetings. The Chautauqua County Sanitary Engineer and the State Game Protectors were invited to attend meetings and review plans. They also made valuable contributions in the way of advice and information.

A general plan of application was then devised through the help of the Conservation Department biologist who worked closely with them throughout. This plan was concerned with safety of residents, stock, pets and safeguarding present fish populations; and insuring no adverse effects on future fisheries. A map of weeded areas was prepared with critical areas determined. Density of weeds, interference with recreation or waterflow, and intensity of the recreational use of the areas were considered in the determination of these critical areas. This might be expressed as: "Where could the most benefit to the most people be achieved with the funds available?" The 1956 program set up about 70 acres to be treated, generally in a strip around most of the shoreline.

*Editor's note: It is now required to have a permit from the Water Pollution Control Board of the State Health Department.

The voluntary contributions came in surprisingly well. The owners of property fronting on areas to be treated were asked for a minimum of $15 per 50 foot frontage. Owners of property not fronting on treatment areas, local merchants, and owners of property considerably removed from the lake showed intelligent appreciation for lake improvement benefits to the whole community and contributed their funds. A bulletin board was maintained in the village to keep everyone advised of progress. The collection totals, some of the better contribution checks, maps, letters, etc. were posted on the bulletin board to keep all informed and to help maintain a high level of community interest.

As the money at first rushed, and finally trickled in, plans were completed and equipment purchased. An outboard motor, a pump and hoses for spraying, materials for a barge, protective clothing for the spray crew and 3,300 gallons of sodium arsenite compound were purchased. Time for spraying was near when all this was completed.

Precautions Taken

On May 30, 1956 the local Girl Scouts assisted committee members' wives in distributing warning notices to all residents living on or near the lake, pinned notices to doors of cottages where no one was home and posted notices on trees and telephone poles in conspicuous places throughout the area. These notices, printed in bold red letters, gave warning that the lake was being sprayed and listed a number of precautions about use of the lake and its water until such time as an "all clear" notice came out.

The following morning the spraying actually started. The spraying, handling the 500-pound chemical drums, and barge and pump operation were all performed by weed committee members on a volunteer basis. The chemical was applied carefully through use of a flow meter and an intricately staked out system of sub-areas to insure adequate, but not over treatment at the rate of 7½ parts of chemical to a million parts of water. It took four days to apply.

The Conservation Department biologist accompanied the spray crew on their barge to observe and assist in control of application volumes which had been previously determined for each sub-area using average depth and surface areas which had been carefully measured. The County Sanitary Engineer and his aides were present at Findley Lake during spraying and for many days after to collect water samples for shipment to the State Health Department laboratory in Albany for determination of arsenic concentrations. State Game Protectors were on hand to assist the biologist in observing affects on fish and other aquatic life.

The entire operation went very smoothly. The lake was sprayed, the public co-operated very well in avoiding use of the lake, and most important, the weeds were killed in the treated areas. Some sub-areas showed better results than others; probably due to water currents or wind effects which were beyond control of the spray crew. The overall picture was definite and obvious improvement of Findley Lake with no harm to the fish and little public inconvenience.

Lake Opened

The State Health Department declared the lake open and again completely safe when water samples showed a concentration of less than one part per million of arsenic. Findley Lake required 22 days to get to the safe level of arsenic after the spraying. This is longer than usually expected, but may be due to the high percentage of the lake treated or to some flow effects which have not been determined. An "all clear" notice was distributed in the same manner as the warning notices.

Encouraged by their 1956 success the Findley Lake weed control committee repeated their program in 1957. The treated areas were expanded to 87 acres or about 30 per cent of the lake. The concentration of chemical was raised to 10 parts per million. This program required 5,995 gallons of chemical. The weed control was better than the preceding year and the lake, despite more chemical and was not closed as long.

It is anticipated that one more year of heavy treatment will give a nice balance of clear areas for recreation and weeded areas for fish food production and fish refuge. Subsequently, reduced treatments on an alternate year basis for various parts of the treated areas of the lake should maintain this status.

The Findley Lake weed control committee is deserving of much credit by their community for tackling a tough problem which was actually lowering property values, and seeing it through to the present stage of "community improvement through lake improvement." One committee member who was dickering for the purchase of a lake front home from a disgruntled owner in the pretreatment era saw his deal fall apart as his own efforts succeeded in changing the lake to a place where the owner wishes to remain. Perhaps that's the price of community service. The whole community deserves credit for co-operative support of the program and the wives of committee members deserve special thanks for the coffee, lunches, and general encouragement without which no such volunteer program can succeed.

Financing this operation was, of course, the biggest problem faced by the weed committee. That they succeeded in raising sufficient funds through popular subscription is further tribute to their ability and effort. A copy of the essential portion of their 1957 financial report is reproduced here for information and for guidance of any similar groups that may contemplate aquatic weed control on a voluntary funding basis:

Findley Lake Weed Control

Financial Statement

August 8, 1956—August 8, 1957

Income	
Donations in cash	$4,275.05
Expenses	
Auditor	10.00
Printing, mimeographing, mailing	193.81
Telephone	11.79
Bond	10.00
Hardware and paint	43.23
Insurance	58.80
Refund of donation	15.00
Chemical and application	4,077.05
Gas, oil and supplies	33.98
Repairs to barge and pump	75.75
*Depreciation (barge, pump, outboard motor)	119.27
Total Expenses	$4,648.68
Expense in excess of receipts	$373.63**

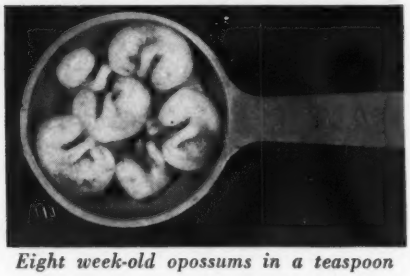
*Equipment purchase in 1956 for $481.85
**Deficit covered by 1956 surplus

Another approach to such financing is followed in some states where Lake Improvement Districts are formed, usually by a 51 per cent favorable referendum of property owners in the proposed district. The Improvement District then becomes a legal entity able to raise necessary funds through tax levies. The services performed sometimes include garbage collection, beach improvement, lake patrol, and others as well as the main job of vegetation control, either locally or contract applied. Such districts, if authorized by necessary State enabling legislation, could be the answer to financing the rapidly mushrooming number of groups desiring weed control in lakes throughout New York State. Until such tax approach is available the "do it yourself" system is a demonstrated success and the example is Findley Lake.

—WILLIAM G. BENTLEY,
Supervisor Fisheries Management

Honeybee and new-born opossum

Part of litter of 14 young in pouch



Eight week-old opossums in a teaspoon

The Opossum in New York

by W. J. Hamilton, Jr., *Cornell University*

MANY motorists are familiar with the opossum, whose gray clad body has become increasingly common on the highway, an inevitable victim of traffic. Fewer know the queer creature in its natural abode, the swales and thickets that run from the paved lanes to the distant hills.

For many years a resident of Long Island and the lower Hudson Valley, it is only in the past thirty years that the 'possum has invaded upstate New York. Now well established from Buffalo to Watertown, a few have even ventured into the Adirondack foothills. If the increasing abundance of these animals we see on the highway is an indication, the creature is here to stay.

A great many people, sportsmen and farmers alike, are concerned with this notable uprise in the 'possum population and its amazing spread in so short a time. Many fear that it will have a deleterious effect on more desirable wildlife. A study of the beast, over a period of years and in all seasons, is essential to a knowledge of its ways. If it is to be controlled, such a study may provide some weak link in its life cycle that may prove helpful in reducing the population. Quite aside from economic considerations, it is well to explore the habits of such a large and widespread animal; to gather as many facts on its life history as is possible.

'Possums do not range widely, a few dozen acres being sufficient to provide the needs of an individual. In its chosen home range, the 'possum selects a brush pile, deserted woodchuck burrow or a cleft in the rocky cliffs for its home. To this retreat it carries *in its curled tail* bundles of leaves and dried grasses for bedding. Among the most nocturnal of our mammals, it does not venture from its snug retreat until after sundown. The night is spent roaming the woods, swales and thickets for food. Dawn finds it replete and drowsing away in the hidden nest, safe from harm. Fall is the season of gluttony, when fat crickets and grasshoppers, apple drops and grapes provide a ready banquet. The advent of Winter brings some hazards, for the 'possum, unlike the 'coon and skunk, does not sleep away the coldest weeks. Instead, it is often abroad in near zero weather, for apparently it can abstain from food only

for short periods. At this bleak season, its naked ears and tail are exposed. These are often frost bitten, the tips being sloughed off.

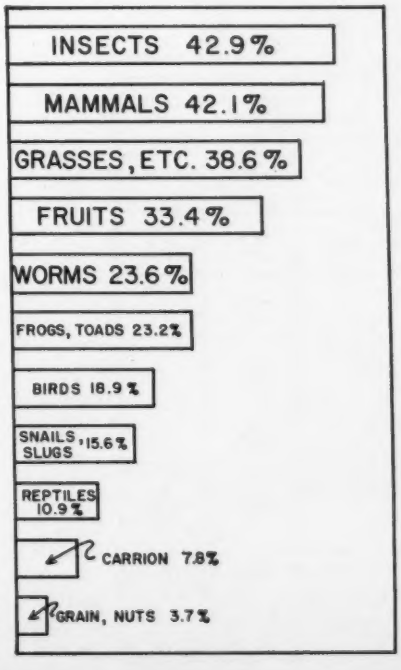
This, our only North American pouched animal, belongs to the great marsupial clan which has its center of distribution in Australia. While most are equipped with a pouch in which the young are carried, a universal feature of the marsupial is the diminutive size and embryonic appearance of the young at birth. Indeed, the new-born have been termed "living abortions" so tiny are they when delivered.

Why do we have so many opossums? The answer, in part, is due to the high reproductive potential. While mammals of comparable size usually have a single annual litter of four or five young, a mature female opossum often produces two litters in a season, each comprising from several to a dozen or even more young. A gestation period of thirteen days, shortest of all New York mammals, permits only a brief stay in the womb. The newborn babies, no larger than a honey bee, have the appearance of a foetus. Indeed, two dozen will fit on a teaspoon. Contrast these with a newborn kitten whose mother approximates a 'possum in size. At birth, the well furred kitten will weigh nearly two ounces.

One structure is well developed and of primary importance to the young opossum's survival. This is the great development of the fore limbs, in marked contrast to the rest of the body. These muscular feet and legs, armed with sharp claws, allow the youngster to make the perilous two or three-inch journey to the lip of the pouch, crawl into the fur-lined haven and grasp a teat. Contrary to widespread belief, they are not placed in the pouch by the mother. Usually thirteen teats arranged in horseshoe shape, are present. As often happens, far more young are produced than the teats can accommodate. As many as 25 young may be born, but only the first arrivals to reach the pouch are assured of survival. Once the circular mouth grasps a nipple, the tip expands and the baby is secure for weeks. Growth is slow, and the young are more than 80 days old before they can clamber to the mother's back. Several more weeks will pass before the youngsters, now the size of a small rat, can maintain their own solitary life. Two litters are frequently produced, hence the increase is rapid. Moreover, the opossum has relatively few natural enemies. To be sure, the horned owl will kill a few, but for the most part, these animals are notably free from predation.

To evaluate the economic status of a species, it is necessary to investigate its food habits. This helps one in determining its role to other creatures. Many believe the 'possum a scavenger, feeding principally on garbage, offal and the dead bodies of other animals. This belief is not borne out by a detailed study of the stomachs of the opossums we have examined. Taken at all seasons of the year, the examination of 461 individuals proves the opossum to feed on much the same type of food as the skunk, raccoon and fox. A varied menu, determined in part by availability, is eaten. While the opossum is often pictured as an expert climber, spending a great deal of its time in trees, primarily it is a denizen of the ground. Here it secures the greater share of its food, whether such be a hapless mouse, a toad, earthworm or fallen fruits and berries. Important foods are insects and mammals, each of which occurred in more than two-fifths of the animals examined. Of the insects eaten, grasshoppers and crickets are particularly prominent in the late Summer and Fall diet, while beetles, caterpillars and various larvae play an important role in satisfying its all-embracing appetite. Field mice, shrews, young cottontails, deer mice and chipmunks are taken in some quantity. Grasses, clover and other green vegetation have been recovered quite regularly. The opossum is as fond of grapes as the raccoon. Blackberries, raspberries, wild cherries and apples are avidly eaten. Earthworms, particularly large nightcrawlers, have been found in nearly a quarter of the animals studied. Surprisingly, the opossums manage to secure this food even when the ground is frozen, removing them from the leaf litter of spring runs. Toads, frogs and salamanders add to its varied menu. The numerous poison glands of the toad, distasteful to many mammals, is of no concern to the 'possum, for nearly 10 per cent of the animals we have examined contained remains of this amphibian. Birds, including domestic fowl, wild ducks, an occasional pheasant and smaller ground nesting species are taken as opportunity affords. Some of the ducks and pheasant undoubtedly represent carrion, for the larger share were recovered from 'possums killed during the open season on these birds. Snails and slugs are represented in 15.6 per cent of the animals. Reptiles include various snakes, principally the garter snake, while two animals had eaten recently hatched snapping turtles. Possibly carrion is more frequently eaten than is indicated in the 7.8 per cent of the animals, for during the Fall and early Winter the opossum has access to crippled and dead game not recovered by the hunter. Surely it gleans a sizeable harvest from the numerous victims of highway traffic. Unlike the raccoon, the opossum eats relatively little grain and nuts. A few millipedes, centipedes, crayfish and fungi are utilized.

Frequency of principal foods eaten—from examination of 461 N.Y. opossums



From this summary, it is clear that the opossum has a rather generalized diet. It cannot be classed as a serious predator of game species, nor of any particular benefit to man because of its feeding habits. Does it have any quality that may stamp it an asset?

The decline in value of long-haired pelts has been notable during the past decade. The 'possum must be ranked in this category. Once prime northern skins commanded a top price of a dollar. Presently the demand for the pelt is so slight that the trapper often does not bother to skin the animal. The fabled "roast 'possum and taters" dish is largely mythical. While some may profess a liking for this pig-snouted beast, I surely can disclaim any fondness for the flesh. I have prepared several with considerable care and added condiments to disguise the taste. If parboiled for three hours, the body cavity then filled with onions and garlic, placed on a thin oak plank laced with bacon and broiled for a full afternoon, one will find the plank fairly edible. While many wild animals provide an excellent dinner dish, the opossum is not one of them.

This study, conducted over a period of many years, has given us some information on which to pass judgment on the beast. In the light of present knowledge, our New York opossum must be judged a neutral species, of little value or concern to man.

Conservation Library Part 7

Books on Oceanography

Part 1 of the Conservation Library appeared in the February-March 1956 issue and dealt with the identification of animals. Part 2 in the April-May issue listed books on trees and shrubs. Part 3 in the June-July issue listed books on herbs (wild flowers) and grasses. Part 4 in the August-September issue listed books on fungi and aquatic plants. Part 5 in the December-January issue listed books on lichens, ferns, and mosses. Part 6 in the February-March 1957 issue listed books on soils, rocks, and minerals.

Future issues will carry lists of books on conservation philosophy, ecology and management.

Reading Guide: *Books are listed in the left hand column and recommending authorities across the top. Stars indicate which specific books these authorities recommend. Accompanying digests show source and briefly outline contents of each book listed.*

Books on Oceanography

The Oceans (1942) by H. W. Sverdrup, M. W. Johnson, R. Fleming; Prentice-Hall Inc., New York. Complex, mathematical treatment of subject. Illustrated, charts, tables, diagrams. Some sections suitable for beginners. Bibliography at end of most chapters.

The Seas (1928) by Frederick C. Russell and Charles M. Yonge; F. Warne and Co. Ltd., London. An interesting introduction to the subject with many illustrations, both in black and white and color. Bibliography.

The Sea Around Us (1951) by Rachel Carson; Oxford University Press, New York. A well written and popular introduction to the subject. A few line drawing illustrations.

Depths of the Ocean (1912) by John Murray and Hjort; Macmillian and Co., London. A narrative and scientific report of Norwegian research ship Michael Sars. Many illustrations, some in color. Interesting introduction to subject.

Biology of the Seashore (1922) by F. C. Flattely and C. L. Walton; Sidgwick and Jackson Ltd., London. Good introduction to life of the seashore. Illustrated. Bibliography.

The Sea Beach at Ebb Tide (1901) by Arnold; Appleton-Century Co., New York. Good general introduction to the subject of marine biology.

Field Book of Seashore Life (1950) by R. W. Minor; G. P. Putnam's Sons, New York. Specialized discussion on marine biology illustrated in black and white and color. Bibliography.

	*Ayers	*Reilly
THE OCEANS *Sverdrup, Johnson, Flemming*	☆	☆
THE SEAS *Russel, Yonge*	☆	
THE SEA AROUND US *Carson*	☆	☆
DEPTHS OF THE OCEAN *Murray, Hjort*	☆	
BIOLOGY OF THE SEASHORE *Flattely, Walton*	☆	
SEA BEACH AT EBB TIDE *Arnold*	☆	
FIELD BOOK OF SEASHORE LIFE *Minor*	☆	☆

DR. JOHN C. AYERS, Associate Professor of Oceanography, Department of Conservation, Cornell University, Ithaca.
DR. EDGAR M. REILLY, Senior Curator of Zoology, N. Y. S. Museum, Albany.

Wild Teas and Tonics

Originally tea was tea—a pleasant, bracing drink made by steeping the cured leaves of the oriental tea shrub in hot water. Later the word came to include beverages made from the flowers, fruits, seeds, stems, leaves, bark or roots of a wide variety of plants. Almost any plant with fragrant or mildly medicinal properties has been used for tea by someone.

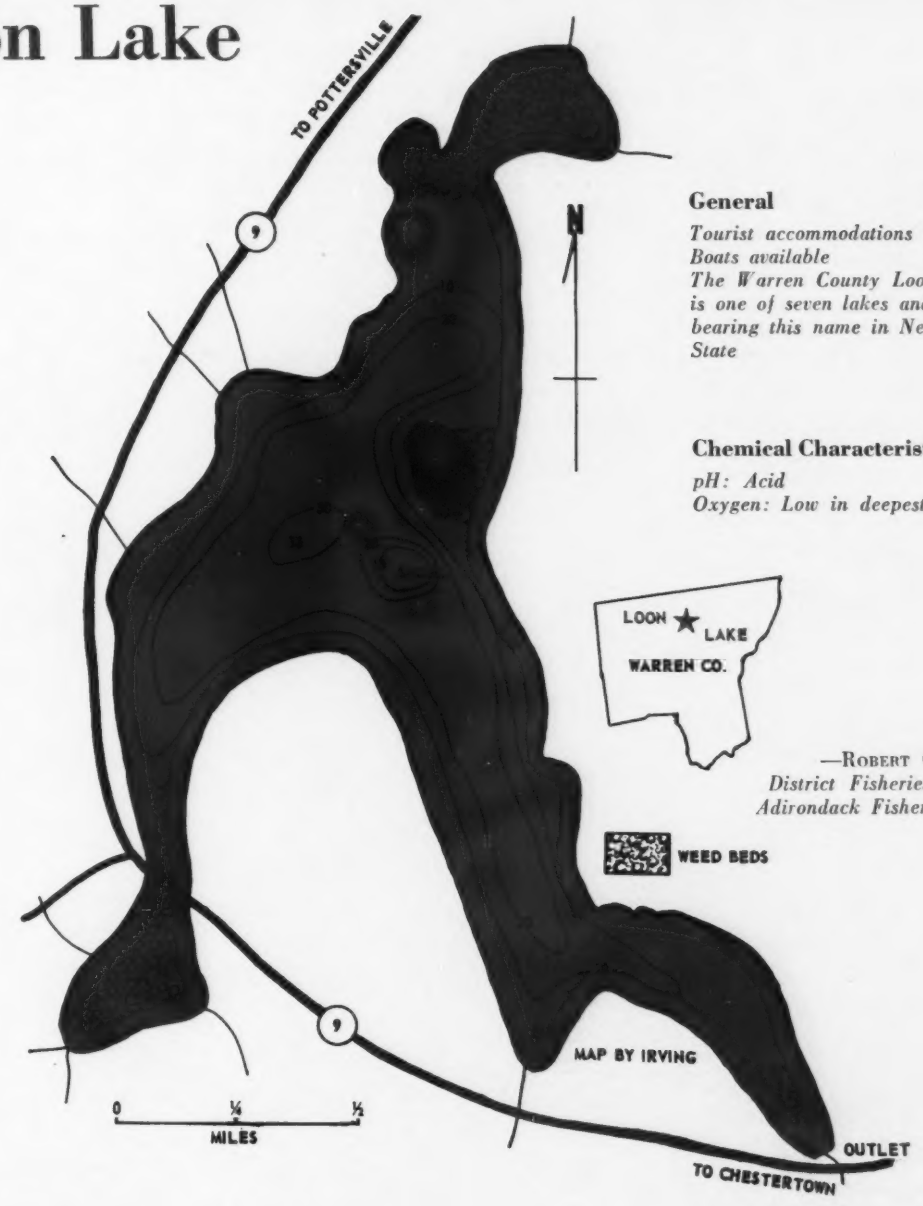
The Indians had traditional systems combining cookery, medicine and magic in which certain plant brews were prescribed for almost every ceremony, physical ailment or mental disturbance. The different tribes often did not agree on which tea was best for what purpose but the early settlers borrowed many beverages and remedies from the red men. Some of their descendants, particularly in backwoods regions, still use them.

In pioneer times when doctors, medicines and money were scarce, some of those home remedies—such as the bitter brews of boneset leaves, willow bark or aspen bark—may have been beneficial in certain kinds of fever. A long list of plant teas—some palatable, some nauseous—were used in various communities as laxatives or for stomach aches and other complaints. Confidence in their value may have given some psychological benefits but, in recent times, most of these panaceas have lost standing with the medical profession.

Perhaps some familiar to us, at least by hearsay, are the old-time Spring tonics drunk "to purify and thin the blood" or improve the appetite. The most enjoyable of these, whether it thins the blood or not, is the fragrant orange-colored tea made by simmering the bark of sassafras roots. Tonics brewed from wormwood seed, the leaves and twigs of spicebush or prickly ash, and yarrow leaves, tasted too much like bitter medicine. Basswood flowers, red clover blossoms, wild ginger roots and chamomile leaves were dried to make enjoyable teas and tonics. Several mints were used, either dried or fresh: Peppermint, spearmint, catnip, horehound, pennyroyal, and Oswego tea or mountain mint. Hops, sage, parsley and tansy were cultivated for tonic drinks and seasoning. Of all these, a few are still recommended as "camp teas" for youngsters and adults trying to imitate the ways of the Indians and early settlers.

People drink them because of the refreshing and stimulating caffeine and similar substances they contain.—From FOREST PRESERVE NATURE BULLETIN, *Cook County, Illinois.*

Loon Lake



General

Tourist accommodations available
Boats available
The Warren County Loon Lake is one of seven lakes and ponds bearing this name in New York State

Chemical Characteristics

pH: Acid
Oxygen: Low in deepest waters

—Robert G. Zilliox,
District Fisheries Manager,
Adirondack Fisheries District

Hunting in Vicinity

Deer
Grouse
Bear
Snowshoe Rabbit
Bobcat

Fur Bearers in Vicinity

Beaver
Otter
Mink
Raccoon
Muskrat

Location

North Central Warren County between Chestertown and Pottersville on Route 9

Physical Features

Area: 582 acres
Maximum Depth: 33 feet
Elevation: 866 feet
Length: Approximately 2.5 miles
Maximum Width: Approximately .75 miles

Fish Present

Brown Bullhead
Northern Pike
Yellow Perch
Pikeperch
Smallmouth Black Bass
Largemouth Black Bass
Pumpkinseed
Red-bellied Sunfish
Rock Bass
Minnows
Suckers

The Ring-billed Gull

by John B. Belknap

NEW YORK STATE can claim the largest Ring-billed Gull colony in the Northeast. Located on Little Galloo Island in Lake Ontario, it has a population estimated at 90,000 breeding birds. This colony was established about twenty years ago during a period in which the Ring-billed Gull showed a marked increase in numbers with an accompanying expansion of its breeding range. Essentially an inland species, its principal breeding range is the prairie region of the United States and Canada, extending east to Georgian Bay. Since the passage of the Migratory Bird Act it has moved east and south and there are now four colonies in New York State (*see map*).

The spread of the species from Georgian Bay has been a gradual one. A small colony near Kingston, Ontario became established about thirty years ago. Ten years later birds were nesting on Gull Island, off Henderson Harbor in Lake Ontario. This is the first authenticated breeding record of the species in New York State. Within a few years, however, the colony on Little Galloo Island got its start and, as already mentioned, has grown impressively.

There are in New York State two more colonies which show that the Ring-billed Gull is continuing to expand its breeding range. One is on Lake Champlain and the other on Oneida Lake. The usual history of a colony, once the birds move in is one of rapid growth, limited only by the size of the island on which the birds have settled. The accompanying map shows the location of the four colonies in our State as well as four others in the Province of Ontario.

Most of the Ring-billed gulls in the Northeast nest on small islands, often on low shoals. Islands having little vegetation are preferred. Although other species, particularly the Herring Gull, sometimes nest on the same islands, the Ring-bills by sheer force of numbers usually appropriate most of the available space.

My first acquaintance with the nesting grounds of the Ring-billed Gull was in 1948 when trips were made to Gull and Little Galloo islands. Since then four other colonies have been visited, but most of my observations have been on the two islands just mentioned. Nest counts were begun in 1950 to secure information on actual population of breeding birds. The colony on Little Galloo is of such size that a sampling technique has been employed to estimate the number of nests.

The Ring-billed gulls build their nests close together on the ground, sometimes more than two thousand to an acre. On Little Galloo the colony occupied about ten acres when first seen. Within five years the area had doubled and the number of nests was estimated to be more than forty thousand. Total nests

(Continued on page 32)

Crossing a beaver pond. Only two boys fell in during the '57 season

The Sargent Pond Overnight

by Larry Pringle

IT'S a clear Adirondack morning. An August sun has burned away the last of the mist from Raquette Lake. On Tioga Point, a counselor is barking orders to a line of twenty-five boys in front of the mess hall.

"All right, you guys, listen! As you go through the chow line, take ten sandwiches, one orange, two hot dogs, three slices of bacon——."

The counselor finishes the instructions and the boys prepare to collect their "rations" for the overnight hike. The food is soon distributed and stowed in the already bulging packs of the campers. The boys are eager and ready for the Sargent Pond Overnight.

This scene is repeated every Monday and Wednesday morning for eight weeks at Camp Raquette, one of four New York State conservation education camps for boys. This central Adirondack camp, which accepts boys aged 13-17 from the South Central and North Central conservation districts of the State, is unique among the four camps in having an overnight hike. Here, it is an integral part of the camp program and has two purposes. For the boys, it represents: (1) Lessons in wildlife management and fisheries, and (2) an opportunity to hike, camp, live in and get the "feel" of the wilderness.

And wilderness it is. The overnight campsite is on a point of land on Lower Sargent Pond, five miles of Adirondack Forest Preserve away from the headquarters camp at Tioga Point. Except

(*Continued on page 34*)

Boys build a straight log dam

Brown trout from Lower Sargent

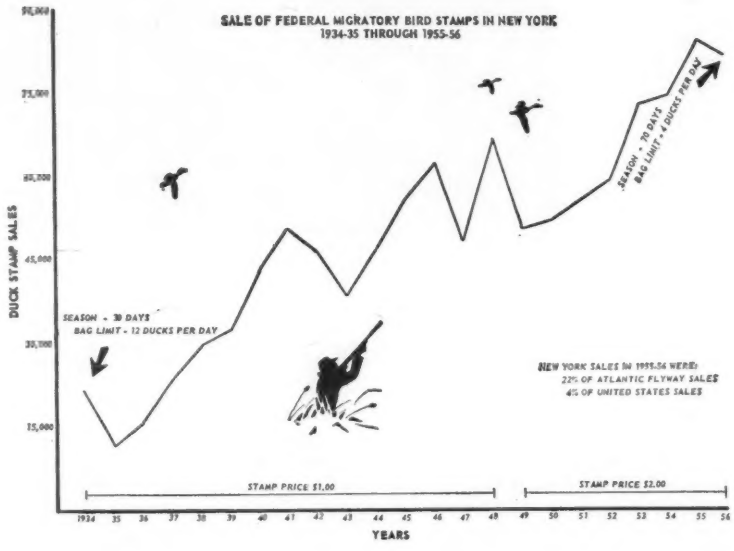
One of the best times of day

Duck Stamp Sales In New York and
In Waterfowl Hunting Pressure

IT is easy on a cold Winter night when in a convivial mood, to blend together one's waterfowling experiences of a lifetime and telescope them into one season as memories of the "good old days." And then, remembering the very average recent seasons, to take the Department and the Federal Service apart for not providing more ducks. Such thinking is all very human but not too fair. In some ways it's a marvel that there still are ducks to hunt. It is an uphill and a never-ending fight to maintain that sport.

Aside from the factors that directly limit and reduce waterfowl habitat (see "Wetlands, Water and Wildlife," CONSERVATIONIST, August-September, 1957), better transportation, cheaper and lighter boats, more powerful ammunition, warmer Winter gear, tougher boots and waders, hand warmers and even electrically equipped blinds work against the duck. But probably the single most important factor is the growth of the human population. This is reflected in the sale of duck stamps.

The sale of the Federal Migratory Bird Hunting Stamp was commenced in the fiscal year 1934-35 with the funds scheduled primarily for acquisition and development of National Wildlife Refuges. Possession of a stamp is required of all duck hunters over 16 years old. The first year, 635,001 stamps were sold in the whole Country and 21,502 in New York, putting our State in tenth place in sales with over 3 per cent of the National sale. The next year, with an extreme shortage of ducks and with strict hunting regulations, stamp sales dropped sharply (448,204 in the Nation and 11,917 in the State). Since that date sales have risen, though somewhat erratically. By 1940 the National sale was 1,111,561 and the New York sale 32,304 for a 60 per cent increase in duck hunters in five years. This upward trend continued through the '40's with minor setbacks during World War II. In 1949 another drop was registered when the price of the stamp was increased from $1 to $2. For the 1955-56 fiscal year (1955 season) 85,814 stamps were sold in New York and 2,369,940 in the Nation. Thus, over a 22-year period, duck hunters in the State have increased fourfold and the National population of waterfowlers nearly as much. Some 22 per cent of the duck hunters in the Atlantic Flyway (nearly 4 per cent of those in the United States) are located right here in New York. Our State now ranks


SALE OF FEDERAL MIGRATORY BIRD STAMPS IN NEW YORK
1934-35 THROUGH 1955-56
DUCK STAMP SALES
SEASON - 30 DAYS
BAG LIMIT - 12 DUCKS PER DAY
SEASON - 70 DAYS
BAG LIMIT - 4 DUCKS PER DAY
NEW YORK SALES IN 1955-56 WERE:
22% OF ATLANTIC FLYWAY SALES
4% OF UNITED STATES SALES
STAMP PRICE $1.00
STAMP PRICE $2.00
YEARS

eighth in the sale of duck stamps, following California, Texas, Michigan, Minnesota, Wisconsin, Illinois and Louisiana, in that order.

From the 1934 season to date, to counter the increased number of hunters, the daily bag has been reduced from 12 to 4 birds, the use of live decoys, baiting and recorded calling devices have been banned, a 3-shell limit has been imposed and other regulations instituted and modified. On the other hand, the season has been lengthened from 30 to 70 days, largely to permit the harvest of different segments of the population as banding studies and aerial surveys have shown the differential movement of species and specific populations. Although the continental duck population has increased over the years as it recuperated from the extreme drought of the early '30's, the increase has scarcely kept pace with the increase in hunters. It should be remembered, too, that weather during the last few years has favored breeding ground conditions. As a consequence, the current waterfowl population is near the maximum possible without the creation of more habitat. What the result would be after a few seasons of drought in the "duck factories" should be obvious.

Meanwhile, the number of duck hunters is still growing, while working hours and travel time become shorter. The result is increased competition for both hunting stands and potential targets. Meat-hunter inclinations, if they were ever justifiable, can no longer be tolerated. Restless hunting instincts, stirred by sight of large rafts and flocks, must be subordinated to a higher form of enjoyment, for current band returns tell us that many groups of ducks are now being harvested near the safe maximum limits. If there are to be adequate returning flocks for Fall harvest, breeding stock must return north in the Spring with a comfortable margin as a cushion against weather adversities. A form of "purist" waterfowler must be developed who will revel over an occasional duck during most of the annual hunting period, and who will consider a limit-bag the banner day of a season. Meanwhile conservation agencies, both public and private, must strive to create and improve habitat just to hold our own. Knowledge of the distribution of hunting pressure is necessary for planning and the following article presents some of this information.

—DIRCK BENSON

This article is based on studies conducted by the Conservation Department under the P.-R. Federal Aid in Wildlife Restoration Program.

What It Means—
In Waterfowl Management

THE graph on the opposite page shows the rise in "Duck Stamp Sales" since 1934. It tells better than words how gunning pressure has built up on waterfowl in New York in the Fall. Now if, coincident with this increase in hunting pressure, we had kept pace by acquisition and development of waterfowl habitat, the picture would still be pretty good. Unfortunately—despite the small marsh program and the purchase of some larger wetland areas—our efforts (and funds) have fallen far short of that goal. In fact, it appears that through encroachment of civilization — filling, draining, pollution, suburban and industrial expansion, etc., *loss* of wetland acreage has progressed at as rapid a pace as waterfowl hunting pressure has increased. Skeptical? Just look around. What's happened to waterfowl habitat in your locality in the last twenty years?

What's the answer? That's easy: Money and effort to acquire more of the existing and potential wetland acreage *now* before it is forever too late. Where and on what basis? Well, we already know, through field surveys and studies carried on by the Department, where practically all of our presently important and potentially valuable wetlands are located, as well as considerable about the use made of them by the waterfowl. (Wetlands are, of course, valuable in many other ways than merely for duck hunting—see August-September, 1957, CONSERVATIONIST.) But there was a missing link. We didn't know nearly enough about the distribution of waterfowl hunting pressure in the State. Through hunter checks we had obtained samples, trends and cross-checks, but nothing sufficiently concrete to pin-point program needs. So we went directly to the postmasters who sell duck stamps required by waterfowl hunters.

Questionnaire cards were prepared and mailed to every postmaster in the State. At the time of our survey, June, 1957, there were 1,829 postoffices operating in New York. We were gratified, beyond all hopes, with the response. Within two weeks, over 95 per cent of the questionnaire cards had been returned, and by July 29, after a second contact, only two offices had not replied. Since then, data has been obtained from these two, so the coverage of sales for the Postoffice Department's fiscal year of July 1, 1956 to June 30, 1957, is 100 per cent complete.

When we tabulated these questionnaire cards, we found that postoffices in New York State had sold a total of 79,852 duck stamps during the season of 1955-56. The distribution of these postoffices is fairly uniform over the State — though postoffices near good duck hunting areas sold more stamps. Also, their sales frequently were larger in proportion to the populations of the communities they served. The accompanying map shows the distribution and totals of duck stamp sales, county by county, throughout New York.

As one would expect, the reported stamp sales indicate, for the most part, more duck hunters, proportionately, in good duck country. At the same time, however, there appears to be strong interest in duck hunting in some counties, regardless of the quality of the hunting.

From this information, once it is more closely analyzed, especially with respect to known hunter-movement, the amount and quality of waterfowl habitat, its vulnerability to destructive forces, plus the average gunner success in the various regions, we shall be able to chart a much more accurate course. Such studies are essential to intelligent planning and a basic preliminary to effective action programs in wetlands and waterfowl management.

—DON FOLEY

Want More Rabbits?

Beagle clubs, fish and game clubs and individual sportsmen deluge us with questions on how to increase our game crop and improve hunting opportunity. The methods presented here are tailored to accomplish this for cottontail rabbits,

Photo 1. Food and cover are plentiful in the Summer

THE cottontail rabbit is seen so commonly in so many different types of environment and is so universally renowned for its ability to multiply that it is somewhat difficult ity envision a shortage of this animal in any weedpatch, brush lot or wood lot. Yet, for one reason or another, some areas are short in their supply. And in most areas of the State, bunny abundance rarely achieves the level this species has been known to reach under optimum conditions.

Weather, predators and a great many of man's activities, particularly as they affect land use, combine to take a heavy toll of rabbits during all seasons of the year. Clean farming, more intensive cultivation, more efficient machinery, expanding highway systems, increasingly heavy high speed traffic and increasing use of poison sprays for controlling weed and sprout growth are but a few examples of man's influence on the environment that can have a detrimental effect on rabbit numbers. Whereas the possibility of changing the causes of these rabbit losses are quite remote where they conflict directly with man's interests, there are very definite opportunities for improving existing habitat and increasing materially rabbit productivity on lands where hunting and dog trials are of major importance.

Ways to improve cottontail rabbit habitat come in all sizes and shapes. They range from the simplest method to suit the whims and ambitions of the occasional hunter right down to the king-size operations more suited to the beagle clubs in their desires to preserve a year around rabbit population on which to train hounds and run competitive trials.

Winter Hazards

Winter is a time of shortages. Overhead cover in which to loaf, feed, hide, and rest has been reduced many-fold from the summertime period of plenty as shown in photos 1 and 2. During especially severe storms adequate shelter from wind and low temperatures is particularly critical and, at the same time, least apt to be found. Likewise, for long periods of time when snow covers the ground the only available food is the bark, twigs, and buds of trees and shrubs. As Winter progresses food supplies nearest the good cover are exhausted and rabbits are forced to wander farther and farther from protective cover to satisfy their hunger. Frequently mid-winter thaws seal off woodchuck burrows (often the only effective shelter during severe storms) from further use as retreats by rabbits. Either water freezes in the entrances or entrances collapse upon thawing and refreeze to form a solid barrier.

In short, deterioration of the Winter habitat means only one thing—fewer and fewer rabbits can be supported, competition intensifies and the resident rabbits become more and more vulnerable to predation, starvation, disease and exposure.

Although in some few instances both food and shelter opportunities can be achieved in one operation the most important point to consider in planning rabbit habitat improvement is to provide additional food near existing good cover, and vice versa. Many smaller, scattered units containing both food and shelter are superior to one large unit created by the same amount of effort.

Shelter

As indicated above, shelter is important not only as protection against predators but is needed as a shield against the elements. Deep snows, high winds, and temperatures below about 20°F send cottontails scurrying to the protection afforded by underground dens or the heaviest cover available. Suitable shelters or cover to satisfy such needs can be created artificially in a number of ways (some of which are illustrated here) utilizing a variety of materials and adaptable to different situations.

Brushpiles

When properly constructed, brushpiles provide an excellent refuge from nearly all enemies. There's an added advantage, too, over most other forms of cover in that food species favored by rabbits can be used in brushpile constructing, thus providing an excellent source of both food and cover in one package. Apple, sumac, maple, basswood and willow are a few of the common tree species relished by rabbits which are suited for this dual purpose. (Orchardists usually are delighted to have their apple prunings hauled away for them—beagle clubs usually are delighted to get them in return for the hauling effort--and if you have any doubts about the rabbit's reaction to the whole deal take a casual glance at their work on the pile a few days after it has been established). Brushpiles should be a minimum of 7'-8' wide at the base and stand no less than 5' high. Any increased value of larger diameter piles as compared with several smaller ones is debatable. The base of smaller brushpiles and at least a portion of larger ones should consist of substantial material which will not deteriorate or settle rapidly. An effective, long lasting brushpile can be made by placing a layer of larger limbs or small logs (which have been limbed) 6'-8' long and laid parallel to one another about 4" apart on the ground (see figure 1). Another layer of similar heavy material is laid on top of and at right angles to this base. Then a layer of smaller limbs, branches, and twigs is added, followed by alternate layers of heavier limbs and smaller branchlets. This provides a fairly weather proof shelter with openings underneath just large enough

Log base assures longer life of shelter

Fig. 1.

Here's How

primarily, but the benefits apply to many other wildlife species. The projects outlined can be accomplished with as little or as much time and effort as you want to invest—go to it!—Editor

to admit a rabbit and small enough to bar any of the larger predators.

Such a shelter will last ten years or longer depending on the tree species used. Hardwood brushpiles are preferred by cottontails over those made from evergreen trees.

Living brushpiles can be made by cutting part way through trees and pushing them over, leaving as wide a strip of bark as possible attached both to the stump and the fallen tree—(see photo 3). At least part of the tree will continue to live and provide shelter for a number of years beyond what a completely severed tree would provide. With conifers, such a tree brushpile would remain green and provide a much more effective shelter than a dead top.

Photo 3. Felled tree with bark attached makes living shelter

Several such trees felled to a common center, either with or without a connecting strip of bark to keep them alive, form a brushpile which is less compact than that described above, but one which can be quickly constructed and which will be occupied rapidly by cottontails (see photo 4).

Stone Dens

Remnants of old stone fences also are an excellent source of material for building rabbit shelters, particularly when poorly drained soils limit the number

Photo 4. Trees felled to a "center" create shelter

of woodchuck dens available. Stones, preferably flat ones, are stacked to form a dome-shaped structure, (see photo 5 and figure 2) with two or more connecting curved tunnels. These dens can be capped with sod to get a more weather proof job, but even without a sod roof, such structures offer a snug refuge from both elements and predators. Multiflora rose, planted near den entrances increases the escape cover benefits and provides a good source of food as well.

Photo 5. Stone piles provide haven from weather, predators

Photo 2. Scarce in the winter

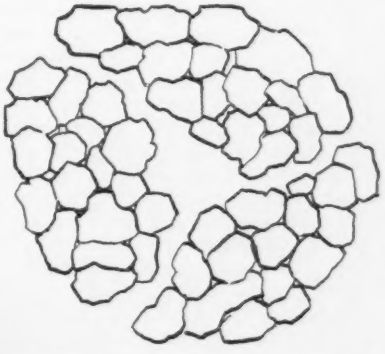


Fig. 2. Stone den "floor plan." Note escape exits

Underground Dens (Artificial)

These dens can be made from scrap tile, wood, or concrete construction materials. A buried box with tunnels leading to it from ground level provides the same comforts as the woodchuck den it simulates, (see photo 6). Sites with drainage toward the den or a high ground water level should be avoided. The two tunnels should connect to the box at opposite corners to provide a direct escape route should weasels or other small predators drop in for lunch.

Photo 6. Wooden den. Top — placement. Bottom—ready for use

Plantings

Several species of trees (when young) and shrubs provide shelter for rabbits. Outstanding in this regard are the conifers which maintain live boughs close to the ground for a great many years. When locked in by snow these low boughs provide excellent, well hidden, heat-retaining dens.

Spruces normally maintain a good cover potential considerably longer than do the pines because of their typical shape and slower growth rate. However, spruce requires comparatively longer from the planting dates to begin providing shelter. When plantations are established mainly for game cover they should be thinned drastically to keep lower limbs from interlocking completely and shading out all ground cover. Clump conifer plantings are the preferred method for game cover. Hardwood species which become associated with conifer plantings should be cut back periodically to induce sprout growth for a food supply close to home.

Multiflora rose doubles as both cover and a food plant (see photo 7). Planted as a woodland or shrub border edging, in clumps or multiple rows, or as a living fence it can provide an almost invincible barrier against most predators. To insure success in establishing this shrub, site preparation including plowing, fertilization and mulching should be practiced.

Ground Cover Development

Mature and intermediate size trees, by themselves, are more detrimental than beneficial as rabbit environment. They shade out the ground plants, valuable

Photo 7. Multiflora rose hedge — good food and cover

for concealment as well as food, and at the same time provide convenient perches and nesting sites for hawks and owls. On areas such as beagle training and trial grounds where rabbits are the principal interest, such trees should be removed. Weed or trash trees, and branches from the better species, can be used for brushpiles. Sales of logs or fireplace logs from the better tree species can finance their removal and perhaps add to the club coffers. Not only are the cover possibilities for dodging enemies improved many fold but the vigorous sprouting of stumps and roots produces a bountiful new food supply (see photo 8). Where it is impractical to completely cut over woodlands, efforts should be concentrated along woodland borders to a depth of 30-40 feet. Trees in hedgerows should be cut out insofar as possible.

Photo 8. Rabbits like hardwood sprouts

Food

Ways and means of materially adding to Winter food availability where and when needed have been mentioned above. Again it is important to repeat that maximum benefits from providing additional food are gained only if a close relationship with good cover is realized.

The number of tree species which can be favored for Winter food benefits (when available as twigs, sprouts, or tender bark) are too numerous to mention here. A few of the better ones have been mentioned earlier.

Because of its widespread distribution; because in general it is considered a weed species and has no appreciable monetary value; and because it offers excellent opportunities for management for rabbits without conflicting with man's interests, a few additional comments regarding staghorn sumac, (see photo 9) are pertinent. It responds vigorously to cutting or breaking the main stem by sending up during the growing season several tender sprouts relished by cottontails during the cold Winter months. After the growing tips get above the height rabbits can reach, bark which is still young and tender is used exten-

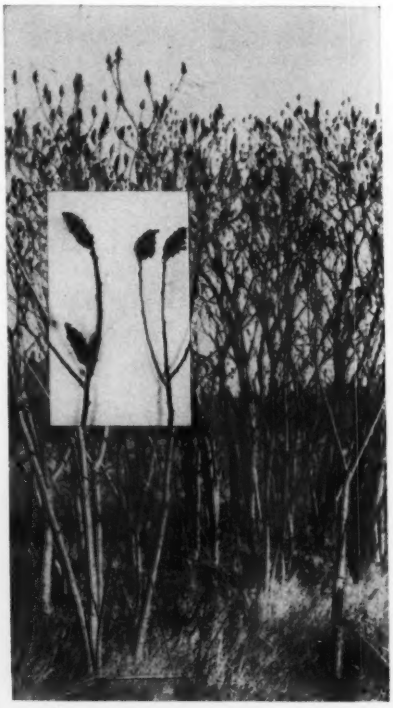


Photo 9. Stand of staghorn sumac. Inset—staghorn, left; smooth, right

sively. However, sumac trees three or more years old offer only course bark at the base of the trunk and no longer are attractive as food. Hunters can do themselves as well as the rabbit population a big favor by bending over, snapping off, or cutting a few of these older stems on

(*Continued on page 38*)

The Owls of New York

DECEMBER night air whipped against the cross-country bus as it rolled across frozen Wyoming prairies under frosty stars. Inside, passengers dozed or gazed sleepily out on the snowy drifts, blue and cold along roadside ditches. From above, the bus must have resembled some great insect with glowing antennas, crawling across a vast white table top. In a rear seat I yawned, stretched, leaned back half asleep and thought of the friends with whom I planned to share the Christmas holidays.

Suddenly the bus lurched. A scream mingled with the sound of breaking glass. Brakes screeched the careening vehicle to a stop and for a moment passengers sat in shocked silence. Then someone said, "Bird!" and someone else said, "Owl!" By that time I was lifting the limp body of a Great Horned Owl out of the shards of windshield glass on the floor of the bus, at the same time trying to calm the hysterical woman in whose lap the owl had originally landed. The driver was in favor of tossing the owl's body out, but when I explained my wildlife painting work, he finally agreed that the corpse might better serve as a model than as coyote food.

Soon we were underway again, the jagged hole in the windshield plugged against the night air. The owl's body lay limp in my lap. I was much interested in seeing what a speeding bus had done to the owl and planned to examine its body closely while preparing the skin as a specimen. Preoccupied with these thoughts, I instinctively caressed the large soft feathers. Suddenly I felt the bird stir and stared at it. Could any creature survive direct collision with a speeding bus? Impossible, I thought as the body went limp once more. Then it moved again. I grasped its feet firmly in my hand. *If* it came alive, it might go wild with pain and slash at me with its talons. A few months before a Golden Eagle had scored on my upper lip and throat because I had relaxed a bit while holding it. I had no desire to repeat the stitching process then required.

The Great Horned Owl did recover. I arrived at my host's home with the live owl tucked under one arm. The only signs the bird bore of its accident were a bloodshot eye and a slight droop of one wing. The owl could eat and fly and in every way seemed normal. I kept this bird for several months before releasing it.

This incident serves to illustrate some of the characteristics of owls. They are night hunters, their eyes apparently being adapted to seeing well with very little light. Their feathers are loose and their strong small bodies are well protected. Many of the owls' flight feathers are soft, making flight almost silent. They are strong, durable birds with great curving talons which can handle prey, sometimes larger than themselves. Owls are non-migratory, usually staying all year in the vicinity of nesting sites. (Occasionally Snowy Owls will move south when their normal food, the lemming, becomes scarce in the Arctic. These flights are not part of a regular seasonal migration but are rather a long-range search for food.)

Because their activities and movements usually take place at night, owls have not been studied as extensively as some other groups of birds and for centuries have been subjects of superstition. Nearly every civilization has given the owl the role of oracle and considered its presence as an omen. Perhaps this was justified. Owls are great mousers and ratters. These rodents are notorious disease carriers. Hence the presence of owls within a town usually indicated a high rodent population, with its accompanying incidence of disease and death. Conversely, when the rodent population decreased, owls became less numerous and the disease rate dropped.

In our own country, the early settlers whose survival depended on food they could raise learned to fear these winged killers that came silently out of the night to destroy their witless, conspicuous poultry. Many people today maintain their now traditional belief that the only good owl is a dead owl.

Actually, these night-roaming feathered mouse traps are among our best bird citizens with only an occasional bird succumbing to temptation and preying on domestic fowl. Larger owls do sometimes take game, but, except in areas of wildlife propagation where there is a superconcentration of birds, they do more good than harm. Killing the slower, weaker, wounded or less alert individuals assures a healthier population of breeding stock to maintain the species.

Owls are sometimes blamed for lack of game birds when the fault actually lies in absence of escape cover near food areas. When such cover is plentiful a large number of individuals of a species such as grouse come through the Winter despite an active owl population.

At present the only species of owl not given legal protection in New York State is the Great Horned Owl. There is a growing movement to include this species on the protected list. Such a proposal reflects recognition of ecological relationships of animals toward one another both by the public and by conservation agencies. Predation has always been with us and has contributed to the development of present day species of wildlife.

The general physical structure of owls may be briefly noted in the following:

Head: The owl's head is unique among birds, in that its large eyes face forward on a nearly single plane, much like a human face. This gives the bird binocular vision.

Ear openings are very large and are located below and behind the eyes near the edge of the feathered face disc. Because owls are largely night hunters, it is suspected that sound plays an important part in this activity.

Ear tufts are merely long feathers which are present in certain species. They are neither part of the ear nor are they near the ear opening. Position of ear tufts may be indicative of an owl's mood, just as the hair on a dog's back indicates when the animal is angry or excited.

The skull of an owl is proportionately larger than that of other birds, being very wide through the ears. This may be another indication of the importance of hearing in the activities of this group of birds.

Body: An owl's body is always much smaller than it would appear in looking at a living bird. Weight-wingspread ratio contributes to easy quiet flight and great maneuverability. The female, as with hawks and eagles, is larger than the male.

Feathers: Owl feathers are large and amazingly soft. Flight feathers have a frayed looking edge, due to lack of connecting hooks between barbs. This cushions the sound of wings striking against the air. The sudden appearance of this silent hunter must be startling indeed to a mouse about to be seized.

Bones: Like those of most birds, the long bones of owls are filled with air spaces. These in turn, are connected to an intricate series of air ducts through out the body. Such hollow bones and air cavities increase strength and lightness and act as an air conditioning unit both in Summer and Winter.

Food: Most food is captured fresh, killed by grasping with the talons and crushing with the beak. Food is torn into large pieces and swallowed—hair, feathers, bones and all. A few hours later and before the next feeding, the owl

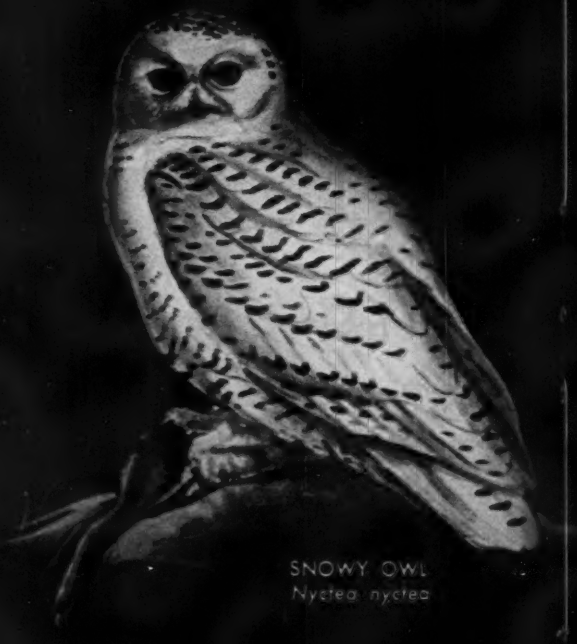
(Continued on page 26)

OWLS OF NEW YORK

GREAT GRAY OWL
Scotiaptex nebulosa nebulosa

BARRED OWL
Strix varia varia

GREAT HORNED OWL
Bubo virginianus virginianus



SNOWY OWL
Nyctea nyctea

HAWK OWL
Surnia ulula caparoch
Gray phase.
SCREECH OWL
Otus asio naevius
Red phase
SAW-WHET OWL
Cryptoglaux acadia acadia
BARN OWL
Tyto alba pratincola
LONG-EARED OWL
Asio wilsonianus
RICHARDSON'S OWL
Cryptoglaux funerea richardsoni
SHORT-EARED OWL
Asio flammeus flammeus

(*Continued from page 23*)
regurgitates undigested parts of its food in the form of pellets or castings. In food-habits studies these are collected by biologists who identify the species of owl from the shape and size of the pellets. Contents indicate the type of food taken. (See an accompanying article by Prof. LeRoy Stegeman.)

Feet: These softly feathered structures end in sharply pointed claws backed with tremendous strength and power. I have had a Great Horned Owl drive its talons through my hand. Of the New York State species, the Snowy Owl has the most heavily feathered feet. This undoubtedly helps them in walking on soft snows.

Pictured in the accompanying colorplates are these New York State species of owls:

Great Horned Owl
(Bubo virginianus virginianus)
Length 21-24 inches,
wingspread 50-60 inches.

Powerful hunter of the woodlands, this owl is capable of killing large prey and is the species which does most damage to poultry and game.

Prominent ear tufts give it its common name as well as the title, "cat owl" by which it is sometimes known. Its most common call is a deep muffled "Whoo" repeated rapidly three times with a pause, then repeated twice. There are many variations of calls, however.

Two or three eggs are laid, usually before the snow is gone, in January or February, the owls often using empty nests of red-tailed hawks or crows. They may also use hollow trees, holes in earthen banks, crevices in rocks or fallen logs. On rare occasions they build a nest which is usually poorly made as if the duties of housekeeping were beneath the dignity of a hunter. Eggs hatch in about a month. Young are able to fly at nine weeks but are dependent on the parent birds for feeding for an additional month.

Great Horned owl

A main item of food is the cottontail rabbit, but this owl will take almost any animal it can handle. From the odor I have detected clinging to its feathers, I would place the skunk high on its list of food items. I have examined many Great Horned owls and each has smelled of skunk, aromatic reminders of many a night-time encounter.

Hunting is not restricted to night for these owls are active in the shadowed depths of the woods and on dark overcast days. Food items taken by the Great Horned Owl include hares, rabbits, gray, red, flying and fox squirrels, chipmunks, rats and mice, muskrats, ground squirrels, pocket gophers, minks, weasels, skunks, woodchucks, opossums, porcupines, domestic cats, shrews, bats, grebes, ducks, Canada geese, swans, bitterns and other herons, coot, gallinules, rails, phalaropes, snipe, yellow legs, woodcock, quail and grouse, pheasants, poultry, mourning doves, marsh, Cooper's, red-tailed and red-shouldered hawks, barn, barred and screech owls, flickers, sapsuckers and other woodpeckers, bluejay, crow, starling, blackbirds, snow buntings, juncos and sparrows, mocking birds, robins, snakes, frogs, dace, goldfish, bullheads, eels, perch, crayfishes, crickets, beetles, grasshoppers katydids and scorpions.

Great Gray Owl
(Scotiaptex nebulosa nebulosa)
Length 25-30 inches,
wingspread 54-60 inches.

This is a deceptive owl in appearance, its body bulk being less than that of the Snowy or Great Horned owls. Long feathers make it look much larger.

The Great Gray Owl is a North Country bird that moves into our States during Winter months. Even then it is not common.

Food of this species consists mainly of small mammals such as hares, rabbits, squirrels, rats, mice, shrews and, occasionally, small birds. Because its home is the Far North where the sun does not set for weeks at a time, this owl is adapted for hunting during daylight hours. Perhaps as a result of its remoteness from man, the Great Gray Owl seems unafraid of human beings, often allowing close approach and even capture by hand.

Snowy Owl
(Nyctea nyctea)
Length 22-25 inches,
wingspread 54-60 inches.

Bird of the Arctic snow regions where it feeds mainly on lemmings (small mouselike animals subject to great population fluctuations), the Snowy Owl drifts southward during Winters when lemming numbers are low. At these times large numbers may reach New York State where they are easily seen and often shot, in spite of protection given them by Conservation Law.

Whenever possible they seem to prefer to feed on rodents and other small animals, although their size and power make them capable of taking larger prey such as rabbits, ducks, grouse, poultry and fish. Such feeding is not common enough to warrant their indiscriminate shooting.

Females are much more heavily marked than are the smaller males.

The Snowy Owl has a considerable repertoire of calls, ranging from a harsh raven-like squawk to a hoarse "Whoo-whoo."

Northern Barred Owl
(Strix varia varia)
Length 19.5-24 inches,
wingspread 44-50 inches.

This large, common owl prefers dark wooded evergreen swamps where it takes over empty nests of hawks or squirrels or may find a hollow dead stub for its home. Eggs are usually two or three in number and hatch in about twenty-five days. Young need another eight weeks before being ready to fly.

The Barred Owl is primarily beneficial in its food habits, with the bulk of its diet consisting of injurious rodents and other animals of doubtful value. It does little damage to poultry or game.

I know of no owl which has such a variety of calls as does the Barred Owl. These range from squeaks through rhythmic "Whoo's" to unearthly cries that may sound like an angry mountain lion or like a woman screaming. This owl seems to enjoy vocalizing and is heard often both day and night.

Richardson's Owl
(Cryptoglaux funerea richardsoni)
Length 9-12 inches,
wingspread 24 inches.

This tiny owl resembles the Saw-whet. The Richardson's Owl is primarily a visitor from further north although it may nest in the United States in high spruce forest regions. Nests are usually in hollow stubs—often the empty nests of woodpeckers are used.

Eggs are usually two to six in number but not much is known about the nest life of these birds.

Richardson's owl feeds primarily on small rodents and insects although small birds are also taken.

This owl's voice is described as sounding like the tolling of a soft high-pitched bell, like water dropping and like a person weeping.

Barn Owl

(Tyto alba pratincola)

Length 15-18 inches,
wingspread 44 inches.

This owl, also known as the "monkey-faced owl" is one of our best mousers. In the wild it nests in hollow trees but it has adapted well to civilization and has taken over outbuildings for nesting sites, hence its common name.

The nest site is usually unadorned and bare, but seems adequate for the five to seven eggs. The young are brought great quantities of food in the form of rats and mice, keeping the parent birds constantly on the go.

Barn owl

In some places these owls have moved into the centers of cities where they help to check the spread of Black and Norway rats. Unfortunately they are not common in New York State except in local areas.

While rodents form the bulk of the diet, this owl also feeds on such things as small birds and insects.

The most frequent call I have heard from these birds is a rapid series of "Caks" or "Clicks" diminishing in scale, although other calls are given.

Screech Owl

(Otus asio naevius)

Length 7.5-10 inches,
wingspread 22 inches.

This small, common, noisy owl comes in two distinct colors, red and grey, and occasionally in an intermediate combination of the two. Coloration has no apparent relationship to age, sex or heredity.

Often the nest is located in hollow broken stubs of trees or in old woodpecker holes where usually four to five eggs are laid. A large percentage of nests seem to be found in old orchards.

Screech owls feed, to a great extent, on small rodents and insects, often catching the latter in flight. They also take small song birds in some numbers.

Screech owl

The voice is most often a soft warbling whistle with a short rise, then a falling inflection. It may be varied with sliding pitch, tones and intervals.

Hawk Owl

(Surnia ulula caparach)

Length 15-16 inches,
wingspread 32-34 inches.

This small hawk-like owl of Canada's northern tree zone visits us occasionally during the Winter. Its habit of hunting during the daytime makes this bird conspicuous.

Its food consists mainly of small mammals and birds.

Calls are variously described as a trilling whistle, a rapid rattle rising to a cry, or a rolling call. All seem to agree that the call of the Hawk Owl is melodious.

Short-eared Owl

(Asio flammeus flammeus)

Length 13.7-16.5 inches,
wingspread 40-44 inches.

This bird is a low flying inhabitant of meadows and marshes where it feeds extensively on rodents and other small mammals. Only rarely does it take small birds. This is probably one of the species which was well known in Europe, where Short-eared owls congregated during rodent cycles.

I have often seen this species hunting in full daylight, sweeping back and forth over grass and reeds.

Nests of the Short-eared Owl are slight depressions on the ground where five to seven eggs are laid.

The calls are varied, some sounding like the yipping of a small dog and others resembling the sounds, "Wak," "Yak," or "Wa-a-a-k."

Long-eared Owl

(Asio wilsonianus)

Length 13-16 inches,
wingspread 38-40 inches.

This moderate sized owl seems to prefer dense stands of conifers and is now often found in such plantations, particularly if located near a stream or marsh. It is fairly common in the State but is often unnoticed since it is seldom active during the day.

The nests, usually in conifers, are built by hawks, crows, squirrels, then taken over by the owls. Sets of four to five eggs seem the most common.

The Long-eared is a beneficial species, feeding extensively on rodents and small mammals with occasionally small birds. It rarely takes game or poultry.

I have observed a number of these owls but have never heard one call. The sound is described as a soft, rather musical "Quoo, Quoo, Quoo," or "Whoof, Whoof, Whoof." It also has other calls denoting anger or irritation.

Saw-whet Owl

(Cryptoglaux acadia acadia)

Length 7.25-8.5 inches,
wingspread 17-18 inches.

This is the smallest owl of the State and is generally well distributed but seldom seen. It is a quiet bird and will seldom fly unless approached closely. I remember one day when I was taking a short cut through a pine plantation in Madison County to reach a red-tailed hawk's nest I wanted to photograph, when suddenly I was aware of a Saw-whet owl less than a foot from my face. It had watched me approach for some time and would have been passed unnoticed if I had been in another row of trees. These owls nest in hollow stubs with old woodpecker holes, where five to six eggs are laid.

Food consists mainly of rodents and insects although small song birds may also be taken.

The Saw-whet's "saw-filing" call is most often heard during February and March, usually just before daybreak. Other calls suggest squeaks, laughs and bell sounds.

—H. Wayne Trimm

Pollution Field Survey

Conservation Department Chemists and Biologist Play an Important Role in the Most Comprehensive Pollution Control Program Ever Undertaken—Anywhere

"WHAT'S the idea of using a seine in that trout stream? Don't you know you can't do that?" Or, "You're wasting time trying to net minnows in there—pollution's killed them all."

These are the sort of questions and comments that have been fired at us ever since the Summer of 1949—our first year of field surveys conducted in co-operation with the Department of Health and other State departments authorized under the Water Pollution Control Law. Sometimes the spectators decide that it's probably not even worthwhile commenting. They simply watch us standing in the middle of some stream, a net in one hand and a white pan in the other, and shake their heads sadly.

Well, what is going on? Actually, all these apparently daft maneuvers have a definite pattern. Through them, information is collected which will play a vital role in the future of our fishing opportunity. It has and will be used in the testimony presented as a basis in determining water purity standards throughout New York State.

A great deal goes on, each year, before we actually get out into these streams with our nets, white pans and other paraphernalia.

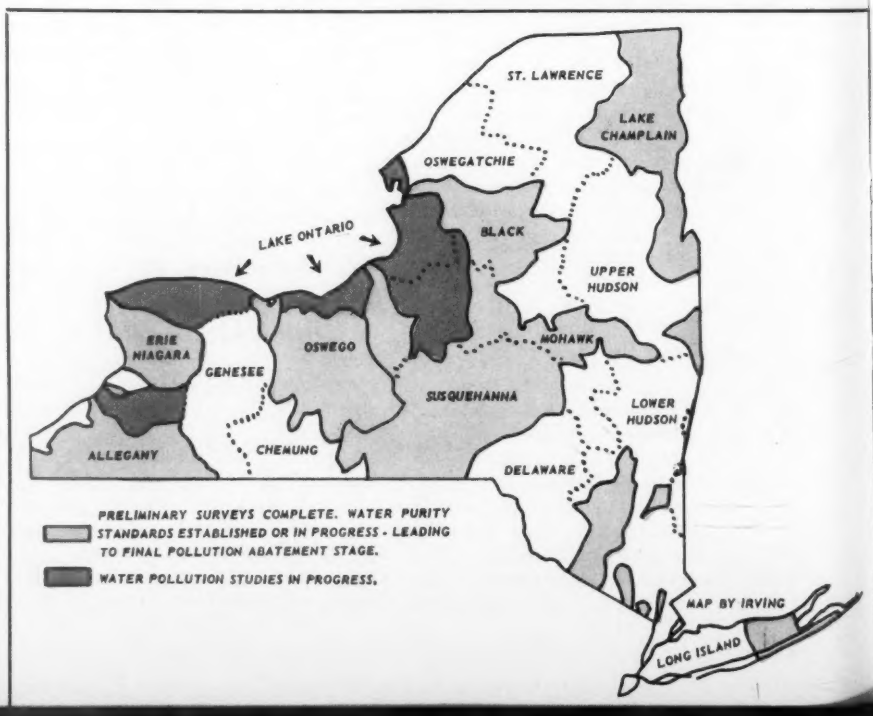
First, it must be determined which watershed drainage basin is to be surveyed. This responsibility lies with the State Water Pollution Control Board. After this has been done, the Chief, Water Pollution Control Section of the State Department of Health, assigns a Senior Sanitary Engineer to take charge of the field work. Under his direction the engineers soon start their preparation by getting from all available sources information on the known pollution in the area. Regional, district and local health departments are contacted, each industry is visited and interviewed, past studies made by State and other agencies are studied, maps are prepared, the large trailer laboratory unit of the Division of Laboratories and Research, built especially for pollution control work, is moved into the area and is set up. Now, after many weeks of work, they are ready to start sampling from a standpoint of public water supply, bathing, industrial and agricultural use, transportation and waste disposal.

Meanwhile the Conservation Department crew has been preparing maps, chemicals, seines and all the other necessary equipment to carry out its part of the job. Technically, we are attached to the Health Department field crew and directed to study the suitability of the various waters for fishing and fish propagation. Co-operation between the two units is excellent and an exchange of information saves duplication of effort and makes for efficient operation.

Now that we are at last out in the field, let's see how the problem is attacked. During the Summer field survey period, the permanent personnel, an aquatic biologist and an analytical chemist, is assisted by an additional chemist. We three move into the drainage area with a station wagon which has been converted into a mobile laboratory. Where the actual sampling starts depends, to a large degree, upon the type of industry to be sampled. It would be foolish, for example, to work below a cannery before the canning season begins. Accordingly, our schedule is arranged so that, wherever possible, we shall be studying waters during the period they're subjected to the maximum degree of pollution. The weather also has an effect on this work. Conditions are hardly normal, for instance, in a stream that is near flood level. The mobility of the unit is of great advantage in such circumstances because it is self-contained and permits shifting to different sections of the drainage area to avoid poor sampling conditions.

Sampling begins upstream above any known pollution. Thus, as the stream is worked toward its mouth, each additional effluent can be more easily detected and evaluated. There are no set number of sampling stations or locations established. If conditions warrant there may be a great many samples taken over a short stretch or there may be none taken at all for miles. The condition of the stream and/or the location of effluents pretty largely determines where samples are taken. In this way much time and effort is saved. We aren't wasting time working waters we know to be clean and thus are able to devote more time to stretches that are bad or potentially so.

Many facts are collected at each station. The name of the drainage basin, the name and map number of the



stream, the county, township and U.S.G.S. quadrangle map are first recorded. A numbering system has been adapted to identify rivers, streams, lakes and ponds throughout the State so that anyone familiar with the system will know immediately which body of water is indicated. The exact sampling location on the stream is carefully noted along with the sources of pollution and their distances above or below the station. The type of production is recorded (slaughter house, sewage treatment plant, plating plant, etc.) from which each effluent originates. This information helps determine what to look for in the sample. As an example, you would not expect to find cyanide in a waste from a milk plant but you could expect it from a plating plant.

Certain physical features of the stream are also recorded. These include width, depth, current, flow, presence of pools and riffles, turbidity and any other conditions that might be significant such as cover, dry or partially dry areas, dredging operations, presence of debris, silting, dams, etc. Another important observation is the type of bottom present. It might be mud, sand, gravel, rubble, bedrock or a combination of these. This has an important bearing on the fish food-producing characteristics of different streams. Both air (taken in the shade over the stream) and water temperatures are very important. This can be well illustrated by trout because if stream temperatures become too warm for even one day a year, that stream cannot support a native population of trout. The time of day the sampling is taken and the date are also carefully recorded, as well as any other pertinent facts relating to fishing pressure, species taken, spawning runs and conditions in general.

We are now getting close to that fellow in the middle of the stream who is peering into the white pan. He is looking at a sample from the stream bottom to see what aquatic forms are present. The white pan makes it easier to see the very small insects, worms, snails, nymphs and other forms that might be there. The presence or absence of certain forms in a stream can be very helpful clues to ecological conditions and valuable measures of pollutional conditions—especially in streams where the pollution is intermittent. For example, certain mayfly and stonefly nymphs are among the first forms to disappear in streams subject to excessive organic pollution. Some snails (air breathers) are not much affected by this same organic matter but are more sensitive to such lethal agents as copper. It is this important property of indicating past conditions that make aquatic populations such valuable indicators of pollution. Thus if one knows the habitat requirements of aquatic forms one can judge quite accurately the worst conditions that have occurred in the stream during the life cycle of the organisms present. In view of the importance of these aquatic forms, samples are taken in the different habitats (riffles, pools, under stones, in sludge, etc.) at each station and the relative abundance of each form is noted. A few individuals or species of some tolerant groups are poor biological indicators. For example, sludge worms *(Tubifex)* and blood worms *(Chironomids)* are generally considered to be very tolerant forms found in areas of gross organic pollution and low dissolved oxygen. But they can also occur in clean water, though less abundantly than in polluted areas. So the presence of a few of these species may not be as good an indicator of pollution as is the absence of other clean water forms. It is, in general, the composition and relative abundance of the different species that is important.

Comparative studies of fish and fishing in streams above and below waste outfalls are also of value in evaluating effects of pollution. In these situations, fish populations are sampled by means of seines and with an electric back-pack shocker. This shocker stuns the fish just long enough for them to be identified and the relative abundance of various species noted before they recover and dart away again. The kind of fish present must be distinguished as well as their size and condition. Many young fish and adults are indicative of successful natural reproduction and survival in the area. An abundance of rough fish, or the more tolerant species such as carp, suckers, bullheads or certain minnows often occurs in polluted waters with a reduction of the more desirable game fish so that some important effects of pollution can be overlooked by neglecting to study the fish population.

There is one more bit of biological data which is also noted; namely, aquatic plant life. This flora is the chief basic source of food for the animal life in any water. Plants, because they extract nutrients dissolved in the water and convert them to food usable by animal life, are important links in any food chain. Usually the richer or more fertile the water, the more abundant will be the plant life—an indication of possible organic pollution. If the vegetation is heavy, the chemistry of the water can vary considerably. For example, plants give off oxygen during the day and carbon dioxide during the night. Therefore, in areas of heavy vegetative growth the dissolved oxygen can vary from supersaturation by day to zero at night. In addition to the green plants, there are other types of lower plant organisms that are important indicators. Among these are bacteria, *(Sphaerotilus* is a common one), fungus *(Saprolegnia* is one common in organic pollution) and the blue-green algae.

Field chemist working from mobile laboratory

While the biologist has been observing conditions in the stream, the chemist has been busy using a special water collecting device. After taking several bottles of water as samples a different chemical analysis is made on each. One

(*Continued on page 36*)

Selective Breeding

by John R. Greeley and Gordon L. Trembley, *Chief Aquatic Biologists,*

Fisheries Biologists Working With Genes—the Tiny Building Blocks of Heredity—Are Shortening the Time Between Bites

CONTROL of animal and plant life of various types through selective breeding is both an old and a new subject. All of our domestic animals and cultivated plants are the product of selection. In many cases the evolution of our present strains and varieties has had its origin so long back in the past as to be almost incomprehensible. The new science of applied genetics, plant and animal breeding, has greatly stepped up the rate at which improvement can be made. Improved strains of hybrid corn, for example, have been developed rapidly.

Selective breeding of fish is a matter of special rather than general interest. In countries where fish farming is important, special strains have been derived for various purposes including better growth or greater beauty, etc. The many strains of goldfish, some almost fantastic in differences from the wild type, offer good illustrations. However, with regard to sport and commercial fisheries which rely on wild fish, practically no selective breeding has been done.

Nature, of course, exercises selection in the survival of fish in various wild environments. Even from the relatively minor amount of testing of wild strains that has been done we know that many species of fish show wide variation in different localities. Such tests on lake trout, for example, have indicated that Raquette Lake and Seneca Lake have very different types of lakers. There is a distinct possibility, or even probability, that a natural strain selected from innumerable generations of survival in a particular body of water may be better adapted for life there than any special strain that could be derived by selective breeding from stock obtained elsewhere. This presupposes, of course, that the original population in this particular body of water possessed enough of the total variability existent in this species of fish.

To some extent fish culturists work with wild strains. Lake trout are reared from eggs taken from wild-caught fish. But, more often, hatchery breeders are used in the rearing of brook, brown and rainbow trout. It is with these species that opportunities for selective breeding are highly important for practical applications in either producing better fishing or saving money in hatchery operations. Once a brood stock of trout has been domesticated as a source of eggs for propagation, selective breeding of one sort or another enters the picture; for the fish culturist can breed only from those fish which respond to hatchery care until reaching the adult stages. Beyond this minimum and even unconscious degree of selection, many fish culturists have consciously selected for certain desirable traits such as rapid growth.

Despite the many years of fish hatchery operation, comparatively little continuous, planned effort toward selective breeding has been put forth toward specific improvement in the strains of trout propagated in the hatcheries and stocked into wild waters. The little that has been done has hardly scratched the surface in the large fields of improving trout for more efficient propagation and for more effective angling results after liberation. The work now in progress by the New York Conservation Department and the Pennsylvania Fish Commission touches upon a number of these specific problems.

At the Rome Hatchery Laboratory a selective breeding project assisted by Federal Aid (D-J) funds is concentrating on developing better disease resistance in brook trout and brown trout. The practical objective is to decrease propagation costs. A bacterial disease known as furunculosis has long been troublesome in many hatcheries and there is reason to expect that it can be much more suc-

Specially designed hexagonal trough showing compartmented fry boxes where progeny from individual matings are kept separate

# of Trout

New York and Pennsylvania

cessfully combatted through the development of disease-resistant strains than by drugs or other methods. In other words, an effort is being made to put to work the old adage—"an ounce of prevention is worth a pound of cure." Fish culturists throughout a wide area have co-operated in this project by furnishing trout of many local strains. The project, now in its sixth year, has already shown that there is a high degree of variation in the resistance to disease of trout from various sources. This is probably attributable to the fact that some of the fish used came from hatcheries where exposure to this disease was long and continuous. The methods used in the project include continuous exposure of all separate lots of trout to furunculosis and then selection of the most resistant fish to be used for interstrain crosses with other promising blood lines.

The selective breeding phase of the trout research program of the Pennsylvania Fish Commission at its Benner Spring Fish Research Station is based on the concept that trout propagation can be only as good as the brood trout from which the eventual stockable trout are derived. Therefore, many objectives are considered simultaneously in the breeding of improved strains of brook, brown and rainbow trout. Included among these in addition to better growth rate are increased egg production and greater egg viability. Since the maintenance of large numbers of brood trout and the picking of large numbers of dead or infertile eggs are expensive production items, the practical purpose of these objectives is clear.

Selection for large eggs must mean that the hatching fry have a better start both in size and ability to survive. The development of brown and rainbow trout which will spawn at two years of age instead of three would save the cost of carrying these trout through an extra barren year. Trout are selected which spawn earlier, not only to allow a longer growing period of the young before planting but also to allow the hatchery men to work more efficiently in the warmer Fall months rather than in the freezing cold of November and December.

The value of trout propagation has been questioned because of the low numbers of trout surviving or returned to the creel. This is attributable, in part, to our changing stream environment and to the inherent qualities of the trout being planted. Therefore, a very important objective being considered is the development of strains which will survive after planting, be vigorous, and be able to live in waters which, in the course of time, have become warmer and more turbid. Caution is being exercised that the esthetic value of trout and trout fishing is not lost with this "man-made" strain; consideration is given to superior body form and the ability to develop the color found in wild fish. A comprehensive study of trout hybrids has been carried on and a number of breeding experiments with these are in progress.

Hybrid trout have received considerable publicity, particularly the "splake" (male speckled or brook trout X female lake trout). While the splake has some promising qualities itself, it is also a fertile hybrid and can be used for crossing to develop possible new breeds of trout not found in nature or to introduce certain qualities into those that already do exist.

Crosses between trout species are seldom fertile and crosses between diverse strains of the same species provide a much more useful basis for work, generally speaking. Whereas selective breeding as long practiced in many lines of plant and animal breeding has been slowed down by the use of blood lines of too great a similarity, modern geneticists have emphasized the value of making crosses between diverse strains. A number of tests of this method in trout breeding have been very encouraging and improved strains can be developed relatively fast.

Scientific procedures in genetics at both the Rome and Benner Spring projects are being accomplished with the co-operation of specialists at Cornell University and the Pennsylvania State University. Since pond space for experimental lots of trout on both projects is limited it is recognized that the problem of developing the best strains for each of many hatcheries can be only partially solved in the research projects. Following shipment of promising strains to various hatcheries further detailed selection at each hatchery will be necessary to develop and retain specially desirable qualities.

What the desirable qualities of trout are will vary not only from hatchery to hatchery but from one planting locality to another. In some hatcheries disease is perennially troublesome, in others not. In some wild waters a trout that will grow to a large size is desired; in others, fishing is managed on a "put and take" basis where it is desirable to grow fish rapidly in the hatchery. In this instance growth after planting is not essential.

When the specific management requirements for various bodies of water are considered, it becomes clear that selective breeding of trout cannot be considered, without reference to desirable field qualities. In addition to traits that lead to more efficient hatchery operation such as rapid growth, disease resistance, etc., it is necessary to have traits that produce desirable field performance to the angler. Such a balanced program requires breeding for more than one trait. In breeding race horses the emphasis is on the development of more and more speed. In breeding trout an all around good performance will count for more than producing champions in just one department.

A visit to Benner Spring, by the way, might remind one of a visit to a stock farm or other animal breeding establishment where each animal is pedigreed and numbered; individual trout are branded with numbers on their backs. In this way it is possible to keep track of desirable individuals rather than to merely use desirable mass lots of trout as has usually been done.

Experiments in selective breeding and hybridization of trout require much trial and error and painstaking keeping of records. It is probable that a large number of "dead ends" in proportion to successful results will occur. In strictly production type hatcheries there is little opportunity to carry on intensive, long-continued experiments to develop the desired qualities in the fish. For instance, production hatcheries are of practical necessity, designed with large ponds. In experimental breeding, on the other hand, many small ponds are needed for the separate brood lots required.

Although interest in selective breeding of trout is neither new nor confined to any one state, so far New York and Pennsylvania have developed this type of work more extensively and intensively than other states. The problem in all its ramifications is so broad that neither Benner Spring nor Rome projects can hope to cover the entire field of hybridization and selective breeding. Looking to the future of constantly increasing angling pressure, encroachment of civilization on trout waters, and demand for heavy stocking of hatchery trout, it is believed that efforts to develop trout strains that can be grown more economically and effectively will pay off on the investment.

the back of the book

Displaced fishes

Pond reclamation can bring smiles of joy to fish taxonomists as they catalog the various species of fish that come to the surface. Frowns of perplexity can also appear as they mull over how in tarnation certain species ever got there. As a result of the state-wide biological surveys conducted between 1926-1939 and from data available earlier, the original distribution of fishes in New York State is generally known. When a rank "out-of-towner" pops up in a pond during reclamation, the frowns are deepened. Disregarding some of the more common displaced denizens of the deep, such as bass, pike, perch, minnows, etc., some queer distributions have been encountered.

Take the case of the smelt. This self-respecting critter is found in deep cold water lakes. Certainly, the species would not be expected to make a go of it in a 15-acre bog pond, having a maximum depth of 15 feet and very little oxygen below eight feet. However, when such a bog pond was treated in August 1952, not only did smelt surface in large numbers, but another deep water barometer, the fine-scaled sucker, turned up also. Later the same year, while treating an 18-foot pond having no cold-depths, several whitefish staggered to the shore.

Or take Stewart Lake in Fulton County, lying at an elevation close to 2,000 feet. Its precipitous outlet eventually makes its way into Canada Lake, some 450 feet lower and several miles away. Eels in Stewart Lake? Ridiculous, says I! But after a host of eels slithered topside, following a dash of rotenone, it can only be considered natural to hedge the point when asked if eels travel the trail to Mt. Marcy. Lake trout also can occasionally turn up in the oddest spots. After just finishing telling a group of sportsmen, viewing a rotenoning project, that lake trout couldn't be in THIS pond, a lonely 12-pounder came swimming to the top.

The mudminnow (not a true minnow) has bettered his social status in New York by making the acquaintance of many new waters. Once primarily confined to weedy, low-land waters, this small fish has become established in a variety of Adirondack ponds. Fortunately the carp has not become widely distributed in the Adirondacks. It has been found in only one of the 89 ponds reclaimed to date. An Essex County pond treated in 1953 was found to contain one species only; stunted northern pike. This Summer, in addition to stocked brook trout, this pond turned up with minnows. Here apparently is a clear case of "spontaneous generation," or for those more scientific minded, perhaps the birds carried the minnows to this pond—that is, yard birds with illegal bait minnows.

Nowadays when we are asked what fishes will appear in a pond as we start treatment with rotenone, we state with an authoritative air that the chances are whales, sharks and piranhas are not to be expected; but for the rest who knows? It's safer that way.—ROBERT G. ZILLIOX, *District Fisheries Manager*

Age of water

Recently Dr. Gustavson, President, Resources for the Future, explained how new devices for measuring radio activity that falls from outer space has permitted scientists to determine the life of water that once fell as rain. By measuring the half-life of tritium in water taken from a well 157 feet deep it was determined that the water fell as rain 50 years ago.

In other words, the rain water we save through insoak today may be pumped from a well by our grandchildren.

Deer and apples

A roast pig with an apple in its mouth is proclaimed a culinary delicacy but there are some apple growers in southeastern Minnesota who dream of deer turning over hot spits with or without apples in their mouths. In the vicinity of Winona we have both apple orchards and deer and the two are not very compatible.

Deer not only eat apples but their idea of how a tree should be pruned does not always adhere to procedures set forth in the orchard grower's manual. Then, in late Summer, bucks like nothing better than a row of young apple trees on which to polish the velvet off their antlers.—Minnesota press release

The Ring-billed Gull

(*Continued from page 16*)

for the other three islands in New York State probably do not exceed four thousand. An example of rapid growth is the colony on Long Island in Oneida Lake. Five years ago it consisted of about one hundred pairs, while in May 1957 over seven hundred nests were counted.

Nesting as it does in concentrated colonies, the Ring-billed Gull lends itself to large scale banding of young birds. In New York State this is best done by mid-June while the young can be caught readily. During the past ten years considerable banding has been carried out both in this State and at the Canadian colonies nearby. In the early 1950's several thousand young Ring-billed gulls were banded on Little Galloo Island. Returns indicate a wide dispersal of first year birds, many reaching the South Atlantic Coast, Florida and the Gulf States.

Although a few Ring-billed gulls remain as far north as New York State all Winter, the majority migrate to the South Atlantic States where food is more plentiful. Gulls are scavengers and live mainly on animal food. In Jefferson County, N. Y., where most of my observations have been made, the Ring-billed Gull is often seen in Spring and Fall on newly-plowed fields, picking up worms and grubs unearthed by the plow.

In April the gulls return to their breeding grounds and nesting begins early in May. The normal clutch is three, although sometimes a nest will contain four eggs, and very rarely, five. In many instances the nest is a mere depression in the ground with little or no lining.

Little Galloo Island, because of its large colony is deserving of special mention. It is situated in Lake Ontario between Stony and Big Galloo islands, about five and one-half miles from shore. Roughly oval in shape, it covers forty-three acres. The main portion of the island resembles a level grassy meadow a few feet above lake level. The accompanying photographs, taken in June, 1953 shows a portion of this colony.

Televised conservation

There is much discussion on educational television and it is good to see conservation taking its place among the early experimental programs.

The Mohawk-Hudson Council on Educational Television is sponsoring a one-semester collegiate course in Conservation of Natural Resources over Schenectady's WRGB (Channel 6). The course, Biology V 20, is being given by Dr. Allen H. Benton, Assistant Professor of Biology, State University of New York, from 11 to 11:30 a.m. each Monday, Wednesday and Friday through January 17, 1958.

The televised course is designed to provide both adults and advanced high school seniors with a basic understanding of the world's resource problems. Emphasis is on the increasing demand being placed on our natural resources due to past wars, rising standards of living and an expanding population. The aspects of our relationship with other countries involving the use and management of natural resources will be stressed.

To receive credit for the course, an adult must be a high school graduate or hold a certificate of equivalency from the Education Department of his state. After registering and obtaining a textbook and syllabus he is expected to view the program regularly, complete the required reading and other assignments and take and pass mid-term and final examinations which will be given at the College or designated centers.

Certainly this program and its progress will be watched with interest.

Outdoor tranquilizers

At a recent meeting, Ross L. Leffler, Assistant Secretary for Fish and Wildlife, Department of Interior, made some comments that seem especially worth remembering:

"We are admitting, at last, that under present ever-more-crowded, hectic living conditions Americans need fish and wildlife far more than any other possible products that might be produced on important wildlife areas—whether power, or transportation lanes, or food, or clothing, or the labor-saving but nerve-wracking gadgets we are prone to brag about. Recreation—outdoor, nature-produced recreation which rehabilitates the mind and feeds the nerves and the spirit—has become, I am convinced, one of the great basic needs of this country. Tranquilizing drugs are sorry substitutes for healthful outdoor recreation."

Adirondack grays

The gray fox (Urocyon sp.), or woods fox as he is often called, pretty well limits his activities in New York State to areas south of the Adirondacks proper. In recent years though, reports have come in of a sustaining population of gray fox in the area east of the West Branch of the Oswegatchie River, roughly triangulated by Kimball Mill, Tinney Corners and Jerden Falls. According to reports from William Benson of Harrisville, this area has been producing gray foxes for the past ten years. Mr. Benson took twelve grays in this area during August while trapping coyotes.

How much food does a deer need?

A 100-pound, whitetail deer, in Winter, requires six pounds of good quality deer browse daily to keep it in good physical condition.

The photograph, using a milk bottle for comparison, illustrates what six pounds of Winter deer food looks like. The bag on the left contains eight and one-half quarts of white cedar clippings; the bag in the center contains four quarts of a mixture of twigs from red maple, striped maple, wild apple and northern red oak; the bag on the right contains three and three-fourths quarts of hemlock. The weight of the combined food bags is six pounds—the equivalent of just one Winter's day food requirements for one deer.

It took one man eight hours to clip this amount of twigs from the growing stems.

Editor's Note:—Just multiply this by 300,000 (rough estimate of Winter population of deer in New York) to see why good management requires an adequate harvest by hunting each Fall; why many ranges are over-browsed; why deer starve during a severe Winter. And remember—does eat too.

Papermills, pollution and sugar

Loggers and papermakers may soon supply sugar from waste materials to sweeten foods.

The Sulphite Pulp Manufacturers' Research League has announced a laboratory method to extract edible sugars from spent sulphite liquor—the waste product in the papermaking industry and a serious stream pollutant. The National Forest Products Laboratory has also reported favorable progress in the use of wood shavings at saw mills and ply wood plants for sugar manufacture. There is a high sugar content in all trees, but only the maple and its sap has been used commercially. We may soon be consuming special bakery goods, candies, dairy foods and canned goods sweetened with wood sugar.

It is estimated that some 2,000 gallons of spent sulphite is produced for every ton of paper pulp produced and the sugar content of the sulphite approaches 2 per cent. Getting the sugar out of the waste sulphite would partially solve the pollution caused by suphite being dumped into streams. The fermenting sugar of the waste sulphite uses up dissolved oxygen in the water, sometimes killing fish in streams polluted with this chemical.

Two plants in Wisconsin are presently using the suphite sugar as a "digestor" to ferment and produce industrial alcohol.

This indicates one more important step where research has shown how waste products, that often cause trouble, can be turned into assets.

Reservoirs and fishing

A recent article by Arthur Grahame (*Outdoor Life*, June, '57) on recreational fishing in municipal water supplies discussed an especially significant experience in New York State. The following, from this article, gives some interesting information on fishing and the New York City reservoir systems:

"Reservoir fishing in New York has been permitted and encouraged for 52 years. Free permits are issued by the City Water Department. Over 3,000 anglers keep boats on the reservoirs and thousands more fish from the shores.

"From our analyses of water samples, John Aalto, engineer in charge of the Catskill watersheds, told me, no direct relation between the number of fishermen using the watershed and the number of coliforms (bacteria which sometimes transmit disease) has yet been demonstrated. Fishing in our reservoirs causes no sanitary or water-contamination problems."

The Sargent Pond Overnight

(*Continued from page 17*)

for occasional signs of human beings, one could easily imagine himself a pioneer in unexplored timber. Tracks and scats of coyotes, bobcats, black bear, otter, fisher and mink add to the wild tang of the country.

But let's go back to Tioga Point and join the two counselors and their charges. After a warning against litterbugging, the counselor leads the way past the camp buildings, the softball field, the rifle and shotgun ranges and into the cool birch and maple woods.

As the trail unwinds before them, the boys see and experience the changing forest ecology — the spruce-balsam swamps, sunlit patches of red raspberries, sugar maple and beech on the higher lands.

Because of their numbers, and hence, noise, the hikers see little wildlife along the route. Usually, nothing more than chipmunks, red squirrels and grouse are seen, but the signs are there—a bear track, a fresh coyote dropping.

With a rest break every mile, the time goes quickly and about noon the hikers reach the campsite. Here the boys are pleasantly surprised. Expecting a "pond," they find a 110-acre lake and a clean campsite with neatly pitched Baker and tarp tents.

A counselor then explains the interesting story of how Lower Sargent Pond was reclaimed by a N. Y. S. Conservation Department's fisheries crew in 1956. Lunch, rest and swimming follow, and the tiredness from the hike soon disappears.

Since the motto of the conservation camps is "learning while doing," the campers learn about stream improvement by building a straight log dam in a nearby creek. Then there are always those brook trout in the "pond," willing to snap at the artificial flies that the boys learned to tie back at the main camp.

For those campers who like to see more of the Adirondacks, a counselor is usually willing to lead an extra hike to new land. The top of a nearby mountain or to Middle and Upper Sargent ponds. Whatever the goal, there is a thrill in leaving the beaten path behind. And with fewer hikers the chances are better for seeing wildlife along the route.

Hikers and fishermen join around the campfire for chow about 6 o'clock. By now, some of the mess kits are adorned with tasty trout caught by the boys.

Before long, the tall pines on the shoreline are silhouetted against the afterglow of the Summer sun. Darkness closes quickly on the wooded lake. The nine hoots of barred owls mix with the screams and yodels of loons. The stage is set for a few "ghost" stories around the campfire. And when the fire dies to fading coals, the boys head for their blanket rolls or sleeping bags under the tents.

Sometimes sleep is interrupted by vandals. Wearing raccoon coats and black masks, they sneak into camp, snorting, chortling, and grunting. They enter tents in quest of trout or bacon and sometimes cut the silence of the night with screams as they fight for some morsel. More often than not, their presence is unnoticed until morning when the food is missed and the 'coon tracks are found everywhere.

There's something about a cool, crisp, misty Adirondack morning that makes some people want to stay in their sleeping bags. But by 8 o'clock, breakfast is finished, everyone's packed and the campsite is clean.

On the return hike, the rest stops are spiced with talks on deer, the Forest Preserve and game management. About noon, the line of 25 boys and two counselors strides out of the cool beech and maple woods, past the rifle and shotgun ranges, the softball field, and the cabins.

Every Saturday afternoon, the boys load their gear on the camp Steelcraft, for their big week is over. As the big boat churns away from the dock toward Raquette Lake Village and waiting parents, each camper gazes back toward Tioga Point. Memories of camp life return, and each boy recalls those experiences which he values most—that big trout he caught, getting 4 out of 5 on the shotgun range, almost beating the staff in softball, the food, the bald eagle soaring over Sargent Pond. Everyone agrees it was a great week.

The camper leaves Camp Raquette with a working knowledge of the fundamentals of conservation. He also leaves with the memory of the Sargent Pond Overnight. Perhaps now, with the thought of his heavy pack fresh in his mind, the camper doesn't fully appreciate the hike. But years later, at a desk, or in a factory, he will cherish the memory of that taste of wilderness.

Live modern

Mrs. Raccoon was looking for a place to raise her family—where they would have advantages. In checking the cottages at Warner's Lake, the Summer home of Mrs. Strevell looked quite suitable. The door was locked but mamma raccoon found by coming down the chimney and pushing out the metal stove pipe plug that she was in the kitchen. Across the kitchen was a swing door which opened easily and beyond that a big wood box with a supply of newspapers—just what she had been looking for. The newspapers, properly shredded, made a wonderful nest and soon there were four young ones to share it.

Everything was progressing satisfactorily until the human occupants came to open their camp and realized their lease had been taken over. To settle the affair they called the District Game Manager to referee the dispute. He, in turn, assigned the case to his district trapper.

The objective was to move Mrs. Raccoon to suitable quarters at the Delmar Wildlife Exhibit. The four youngsters went with little fuss but when the trapper tried to snare Mrs. Raccoon as she came out of the chimney all he got for his trouble was a near fall from the roof. Mrs. Raccoon disappeared in the woods and the family of four began bottle feeding at Delmar where they're now waxing strong and healthy.

25th year for Cortland hatchery

The Cortland Experimental Fish Hatchery, operated by the U. S. Fish and Wildlife Service, celebrated its twenty-fifth year with an open house on September 29. The response from the public exceeded the best expectations with over twelve hundred persons visiting the station in one afternoon. The visitors came from as far as Ithaca, Auburn, Syracuse, Utica and Rome.

Visitors were especially impressed with the stock ponds of large breeder trout and the rearing ponds with their multitudes of young fish. There were newly-designed and lighted exhibits illustrating the development, nutritional

requirements, natural foods and the role of Mother Nature and hatcheries in the management of trout for better fishing. Of interest too, were the displays of fish diseases, aging fish by scale readings and the many publications resulting from the work at the station.

A co-operative undertaking, the hatchery works closely with the State Conservation Department and the fisheries unit at Cornell University. It acts as a collecting station for brown trout eggs to service Federal and State hatcheries throughout the Nation and is a training station for fish culturists of the U. S. Fish and Wildlife Service. The hatchery, along with its more important work of studying trout physiology and nutrition, supplies considerable numbers of fish for stocking in New York.

The years ahead hold much promise at this installation and can only result in bettering the trout fishery which has such important recreational aspects for so many people.

Liberalized angling

A report from Wisconsin indicates that ten years of unrestricted angling have failed to "fish out" a test group of lakes. Fish of any size and species were harvested year-round and some interesting facts have developed from the study.

Over a 10-year period anglers fished 228,941 hours, 12 months each year, and removed 119,772 fish without harm to present or future fishing. Yellow perch made up the vast bulk of fish taken in some years while walleyes led in others. Bass were relatively common in the catch some years, less so in others. The catch of smallmouth bass the last three years of the decade was almost identical to the catch during the first three years.

Fishing pressure varied from as low as 21.6 hours per acre to as high as 123.2 hours per acre and the annual yield of fish ranged from 9 pounds to 26.9 pounds per acre and from 12.9 to 48.3 fish per acre.

Ice fishing was permitted, but had little or no effect on open water fishing. Only 6 per cent of the total fishing pressure was from ice fishing and accounted for only 14 per cent of the total catch.

Keeping up with the turkeys

On November 7, 1952, 170 wild turkeys were liberated at Allegany State Park in Cattaraugus County. This was the beginning of a program to re-establish this grand game bird to its former range in New York State. This initial stock was from poults supplied by Pennsylvania's wild turkey farm, and reared at our own Sherburne Game Farm. Since then, through interstate co-operation of game propagation units, our game managers and game researchers have released 2,600 wild turkeys in various age groups in 13 Southern Tier counties of the State.

Some of the releases failed, some are in doubt, but a number have produced rather spectacular results. The three-county area of Cattaraugus, Allegany and Steuben now supports a vigorous and expanding turkey population. Here, stocking has ceased and the many flocks, including many fifth generation wild birds, have shown they can take some pretty rugged Winters.

While the turkey comeback is good news, it should be remembered that quite a bit of New York State was never turkey range. The first explorers found few gobblers in the Adirondacks and Catskills. Apparently the snows came too early, piled up too deep and stayed too late. From the early reports we gather that the Tug Hill area of Jefferson, Oswego, Oneida and Lewis counties was never a good place to feather a war bonnet either. With much of the rest of the State cut up in farms or logged off by the late 1800's, it is easy to see why we lost our native turkeys. Fortunately, much of the land that proved unsuited for farming is returning to forest.

Nearly every week's mail brings a request or suggestion for turkey stocking somewhere in the State. If you have such a spot in mind, you might rate it against the check-list the Department now uses for selecting potential release sites: (1) A block of at least 3,000 acres of which more than half is wooded. (2) Winter snow depths seldom exceeding 12 inches. (3) A minimum of domestic poultry flocks nearby (Blackhead and other poultry diseases play hob with wild turkeys). (4) Plenty of oaks and beech (for Fall and Winter food). (5) Some surface water at all seasons of the year (particularly in Winter, turkeys seek out spring runs and streams for needed green stuff).

If the site you have in mind scores five on this list, by all means drop us a line. If it is in the Southern Tier, it's a good bet that it has already been stocked; elsewhere, we may already have it on the list for future stocking. But let us know anyway, we may have overlooked it—New York is a pretty big State.

We have inquiries from time to time as to whether the sportsman can look forward to hunting wild turkey in the future. It isn't possible to answer that question yet. Considerably more information on present populations must be gathered and analyzed. Nevertheless, barring any catastrophic effects on the present populations, our game men are agreed that limited hunting opportunity may be possible in the near future.

Here's one we missed

In the Aug.-Sept., 1957 issue we pictured or mentioned some thirty-four water-powered mills still operating in New York State with the hope that we had them all. Now, information received from Julius Eckert, Forester out of Middletown, disturbs our complacency and tells us about this one that we missed.

Owned by Thomas P. Shultis, it is located at Yankeetown Pond, Wittenberg, in Ulster County. History has it that Philip Shultis bought the original site from Livingston. Madison Shultis purchased it from Philip and rebuilt an upright mill in 1892 which burned in 1908. Thomas and his father, Fordyce, acquired the site in 1913 and built the present mill in 1914.

With a maximum sawing production of 5,000 bd. ft. per day the mill also contains two planing machines and a shingle machine—all powered by water. All pulleys are made of hard maple, and replaceable maple cogs in one of the gears have been in use for forty years.

In full operation throughout World War II, this small mill produced an estimated one quarter million board feet of oak ship timbers per year for the duration. During 1942 it produced the timbers for six minesweepers built at Kingston. At the present time Mr. Shultis still does some custom sawing and planing.

Fish sticks

Those who can remember the cat snoozing on top a barrel of salt mackerel or pickled herring in the old country store would find it hard to believe their eyes in today's super-markets. The quick-freeze and customer-packaging is revolutionizing the fishery industry, according to the Atlantic States Marine Fisheries Commission.

Ready to heat and serve products such as fish sticks, breaded shrimp, frozen fish and shellfish, soups and chowders are now commonplace. In 1955—to cite one example—the Commission reports that more than 1 billion, 40 million fish sticks were sold over the counter.

Pollution Field Survey

(*Continued from page 29*)

of the most important constituents of water suited to fish life is dissolved oxygen. This figure can vary greatly depending upon the temperature, the presence of plant life, the time of day, amount of organic matter present and on many other factors. When organic materials (such as sewage, milk wastes, cannery wastes and others) decay, oxygen is utilized. When this takes place in the water oxygen is removed; sometimes in sufficient quantities to prove lethal for fish and other aquatic forms. Therefore, a test for oxygen is always run (this is the test where those pretty colors appear and disappear as if by magic). Along with an oxygen reading goes another bottled water sample which is put aside and later incubated at a uniform temperature (68°F) for five days (normally). This will give an indication of the load of decomposable matter in the water. It is called the biochemical oxygen demand, commonly spoken of as B. O. D. This measures the oxygen needed to reach a stage of stability with respect to bacterial action.

The amount of carbon dioxide in the water is important too. High concentrations are usually accompanied by low oxygen. Variations in CO_2 content also changes the relative neutrality of the water. Here, if you are watching by the stream, you see the chemist peer into a little black box and turn a dial. He records what he sees as a pH (acidity) value. Most fish tolerate a wide range of pH but the reading is important for detecting pollution and also for evaluating the effects of polluting substances. One other chemical determination is done routinely, this is alkalinity. These three values, CO_2, pH and alkalinity are tied rather closely together and usually are considered together. The character of the water and its mineral content can change the toxic effects of a chemical waste. For example, ammonia is much more toxic to fish at high pH values than at low values. Copper and other metals are more toxic in soft acid waters, and acid wastes added to a highly alkaline stream may be much less harmful than if added to an already acid stream. It can be seen that very often the toxicity of a given waste can vary considerably depending upon the type of water in which it is found.

In addition to these routine samples, special studies are often made to detect the presence of such things as cyanide, copper, chromium, phenols, chlorine and other suspected or known substances. Most of these latter analyses are done back in the laboratory because of the need for special equipment not commonly carried in a mobile laboratory. Many times several samples are taken from the same station during the day and at night for comparison. Or perhaps samples may be taken over a period of time during the day, as may be required for a complete picture.

This work goes on from station to station all Summer long and finally the drainage basin has been covered. The facts that have been collected at each station are soon organized and sent to the Health Department engineers so that they can be incorporated with their findings. They are also submitted to our Department in Albany where they are used to help determine what the classification of each stream should be. Finally these data are all published, along with the proposed classification of all waters in the watershed. This report is made available to all interested persons prior to the public hearings which are held before the proposed classifications become final.

Every stream and every station is different from every other one. Field studies are important and becoming even more so as our water use increases for agricultural irrigation, industrial, recreational, water supply, waste disposal and the many other demands that we all have for water. These studies constitute one of the many steps toward compliance with the law to control, prevent and abate pollution in the waters of the State.

—HOWARD J. DEAN,
Aquatic Biologist

Tagged fluke

During the month of June this year, Conservation Department biologists tagged and released a thousand fluke in Long Island's Great South Bay to investigate the sport fishing pressure and the seasonal decline in the catch in comparison to the effort of the bay angler.

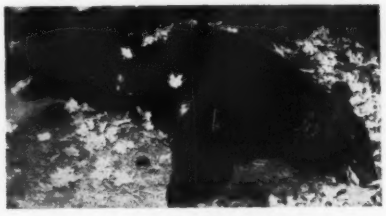
Contacts were made with co-operating fishermen throughout the Marine District to record the catch statistics and the return of tags from the fluke.

Want a buffalo?

If you have been unsuccessful in getting a deer, how about buffalo steaks?

The U. S. Fish and Wildlife Service periodically sells surplus buffalo from the herds on National Wildlife refuges and a recent release indicated some 225 animals that are surplus to the range carrying capacity at the Wichita Mountains Wildlife Refuge in Oklahoma. You can buy either a whole or half animal. Prices vary from $140 to $160 depending. on how you want the animal butchered and packed. If you just want to keep a buffalo on hand until you need it, a live one sells for $150. They will even corral the critter and help you load it on your truck.

Further information can be obtained from the Refuge Manager, Wichita Mountains Wildlife Refuge, Cache, Oklahoma.



The wild frontier

Policemen in Rome (N.Y.) are not unused to calls for assistance to handle situations involving wandering wildlife —a fox in the street, a deer in a hotel, a skunk under the porch or squirrels in the attic. But when a report of a full grown black bear strolling down Erie Blvd. came in, all hands turned out—armed. When the police arrived on the scene all 272 pounds of a wild black bear was up a tree. One well-placed rifle shot ended bruin's city excursion.

On examination, it was found that bruin was one of a number of bears trapped by Conservation Department crews during the Summer and subsequently released with numbered metal tags in its ears.

On checking the tagging records, it was found that the bear had been live-trapped originally at Stony Gate Lodge near Long Lake on August 11, 1957. After the biologists had weighed, examined and tagged the animal, it was transported to the Tug Hill area and released northwest of West Leyden, Lewis County. The biologists wanted to find where and how far the bear might travel when transferred to new territory. By October 23, it was 25 miles from the point of release, and up a tree in the City of Rome.

The life span of animals

Animals living under natural conditions rarely approach their maximum possible age because of very high death rates. Infant mortality, diseases, predators, bad weather, accidents and competition for food and shelter all take their toll. Most of the reliable information about the length of the life span comes from zoos, where accurate records are kept and animals live under conditions almost ideally suited to prolong life.

Large animals tend to live longer than their smaller relatives but there are many exceptions. For example, man is longer-lived than any other mammal. After him, in age, comes the elephant, hippopotamus, horse, rhinoceros, the bears, the big cats and many others which are larger in size. In general, birds live longer than mammals, and certain reptiles the longest of all. A giant tortoise is known to have lived 152 years on the Island of Mauritius and then was killed accidentally or it might have lived a century longer. Even our common box turtle rather frequently reaches the 50-year mark.

The following examples of extreme old age are from reliable records of zoos and aquariums all over the world:

Mammals	Years
Elephant	69
Horse	50
Hippopotamus	49
Chimpanzee	40
Grizzly Bear	32
Bison	30
Lion	30
Tiger	25
Elk	22
Mountain Lion	20
Beaver	19
Wolf	16
Squirrel	16
Chipmunk	12
Cottontail	10
House Mouse	4

Birds	Years
Turkey Buzzard	118
Swan	102
Parrot	80
Great Horned Owl	68
Eagle	55
English Sparrow	23
Canary	22
Humming Bird	8

Reptiles	Years
Giant Tortoise	152
Box Turtle	123
Alligator	68
Snapping Turtle	57
Cobra	28
Cottonmouth	21

Amphibians	Years
Giant Salamander	55
Toad	36
Bullfrog	30
Mud Puppy	23
Green Frog	10
Newt	7

Fish	Years
Catfish	60
Eel	55
Carp	47
Mosquitofish	2

Insects	Years
Cicada	17
Ant (queen)	15

Battle of the brush

To understand the "battle of the brush" one must first understand some basic biology. As any farmer knows, the climate, soils and plants of New York State are such that almost any open field will become overgrown with shrubs, bushes and small trees, ("brush"), unless the land is regularly plowed, mowed, burned, sprayed or cut-over.

"All right," you say, "so what's with that? Doesn't wildlife need shrubs and trees to provide necessary food and cover?" Yes, but like all things, brush is best in moderation. There can be too much of a good thing. There's too much when it encroaches on new tree plantings or farmed fields; when it covers earthen dikes on ponds and marshes; when it chokes out all shoreline openings for fishermen and nesting ducks; when it blocks roads and trails; when it hinders reasonable hunting opportunity for hunter and dog; when it prevents herbaceous species from growing in areas where a certain amount of such cover is necessary for wildlife that needs succulent grasses, weeds, seeds and insects; when brush species that have little food value, like alder, should be replaced by something better (like dogwoods). We could go on and on but by now you can readily understand that brush like "weeds" may be undesirable when growing in the wrong places or consisting of wrong species. Thus, game managers must control brush to maintain a desirable pattern of open fields interspersed with well balanced shrubby and wooded units. In the past, such control has meant many man-hours of costly hand labor using mowing machines, plows, axes, machetes, saws and bulldozers. But now there has been developed a new mechanical monster, the rotary brush cutter, which greatly simplifies brush control.

Looking for all the world like a king-size lawn mower, the rotary brush cutter has become a prized tool for cover management. Operating on the power take-off and hydraulic system of a tractor, this machine engulfs a six-foot swathe, chews brush indiscriminately into pulpy fragments and spews it neatly out as it goes. The curved, cutter blades are capable of whipping hardwood saplings three inches in diameter into evenly-distributed mulch in a matter of seconds. The hydraulic system allows the operator to guide the rubber-tired unit over rocks and stumps with a flick of the wrist.

Rotary brush cutter

Ideal for controlling brush encroachment on cultivated lands and shoreline areas, it also does a credible job of mowing hay for raking, creating ready-made trails through wooded areas and brushing out fence lines.

On newly-created marshes and marsh ponds, it can be run over the ice to clip off unwanted brush and small trees. It can be operated ahead of survey parties to open lines for instrument sightings. It mows road and truck-trail shoulders, and creates openings for field dog trials on measured courses. It backs into the alders along a trout stream and chews a six-foot hole from which a Cahill can be floated on the waters.

Rugged to an almost unbelievable degree, the rotary brush cutter follows wherever a tractor or bulldozer will pull it; chewing and spitting brush from areas so thick a man couldn't swing an axe in it. The aftermath of such brush cutting is fresh new green growth which comes in quickly where shaded brush-choked ground prevailed.

Certainly this tool has filled the gap most effectively between mowing machine and axe in brush manipulation and has already become a most valuable game management weapon in our never ending "battle of the brush."—A. S. Taormina, D. G. M. and S. G. Ernst, Asst. G. M.

Want more rabbits?

(*Continued from page 22*)

each hunting expedition. If done from mid-winter on, all the tender growing tips normally out of reach become available as a new source of food when it is needed most. The inevitable sprouting the following Spring and Summer produces an additional food supply where none would have existed otherwise. Heavy annual clipping by rabbits keeps the growing stems from escaping out of reach and the vigorous root stocks continue to push up new shoots annually. Techniques which offer such remunerative rewards for so little effort expended are all too few! Many of these comments also apply to other hardwood species but most have conflicting usages or, in a few years, grow too large for felling without tools and an increasingly heavy work effort.

Where it is desirable to introduce sumac to a new location, successful transplants of root stocks can be made.

The methods described above are concerned only with one critical period in the cottontail rabbit's yearly battle to compete for a place in Nature's order. In a future article means of improving Summer cover aimed at a greater survival of young will be discussed.

Predation

Throughout this article frequent reference has been made to the necessity of adequate food and cover to thwart the efforts of predators to satisfying their hunger by whittling down the rabbit population. This is not intended to place undue emphasis on the role of predation as a limiting factor on rabbit abundance. Where rabbit food and cover necessities are in adequate quantity and quality, rabbits and predators can be found in the same coverts in goodly numbers. Predation is but one of several factors which keep game abundance within the capabilities the habitat can provide. Predators take what comes the easiest and a stomach full of berries, mice, fish, or chipmunks is just as satisfying as one stuffed with rabbit.

And, remember, no matter how successful you may be in creating an ideal cottontail habitat through proper association of year-round food and cover, some rabbits will be lost through predation. Your efforts in food and cover management simply minimizes the hazards to cottontails in their age-old role as a species of prey.

—JOSEPH DELL,
Game Research Investigator

*This article is based on studies conducted by the Conservation Department under the P.-R. (Federal Aid in Wildlife Restoration Program).

Herbs

An herb, to a botanist, is a plant with tender stems—they are not permanently woody like those of a shrub. To most people, herbs are plants with fragrant stems and leaves, or pungent seeds, used in cooking, pickling, perfumes, or medicines. Their use for such purposes, particularly the latter, is as old as the hills and in every country there is a wealth of folklore, legends and superstitions about them. The early American colonists had herb gardens. They included several kinds of plants used to flavor foods and, especially, to disguise the taste of old half-spoiled meat. They also included many medicinal plants called "simples" or "physic herbs" used in home remedies for all sorts of ailments.

The pioneers who settled this country had no time for such folderols as herb gardens. They could kill plenty of wild game for fresh meat; and there was a great variety and abundance of wild native plants which, from the Indians or by experiment, they believed to be efficacious for home remedies—and many of them were. Medicine men travelled around the country selling liniments, "pain killers" and "roots, yarbs and squills." As late as 60 years ago, only a few herbs were commonly used here for flavoring food: Sage, in homemade sausage and the "stuffing" in a Thanksgiving turkey or goose; Summer savory, for the same purposes; dill, in cucumber pickles; caraway seeds in sauerkraut and rye bread; and thyme, which was a favorite among people from New England, England and northern Europe.

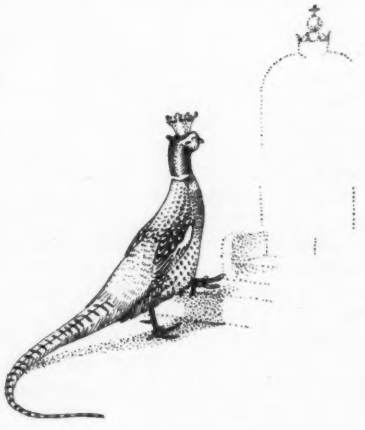
During the past 20 years, herbs and many kinds of herbs have become increasingly popular with American cooks. Packaged herbs, and their seeds for planting in gardens or window boxes, can be purchased in stores. Recipes notable for their use of various herbs are published in magazines, pamphlets and cookbooks. Housewives may now give flavor and variety to everyday dishes that tickle our palates and rival the specialties of famous chefs. Further, because some herbs are better when green and fresh, many epicures and gardeners now grow their own and there are excellent publications with directions for doing so.

When you study the culinary or "kitchen" herbs, a curious fact appears: Most of them are natives of southern Europe or the Mediterranean region, and most of them belong to the mint family. Further, with the exception of chives, garlic, and other relatives of the onions, the rest belong to the parsley or carrot family. The mints have square stems with opposite or whorled leaves, and their fragrance comes from aromatic volatile oils in tiny glands on the leaves. Those in the parsley family, aside from a characteristic type of flower clusters, known as an umbel, mostly have compound leaves with a distinctive taste but not much odor, because the aromatic oils are contained in the seeds.

The parsley family includes caraway and anise, of which the seeds are used for flavoring; and dill, parsley, celery, fennel and servil—whose leaves are used in soups, salads and other foods. The mint family includes such familiar herbs as sage, Summer savory, several kinds and flavors of basil, marjoram (most versatile of herbs), thyme, rosemary, terragon (used mostly in pickles and vinegar), oregano (used sparingly in pizza and other Italian dishes), and spearmint, peppermint, curly mint, apple mint, pineapple mint, und so weiter.

Caution: When only dried herbs are available, use half the recipe quantity for fresh herbs. Add them during the last stages of the recipe because many herbs, if cooked too long, will give a bitter taste to the foods.

The English sound the "h" and say "a herb." We say "urb."—DAVID H. THOMPSON, *Sr. Naturalist, Forest Preserve Dist., Cook Co., Ill.*



All hail the king

A recent description of the pheasant by James Kimball, Director of the Minnesota Game and Fish Division, impressed us as really hitting the nail (pheasant) on the head when it comes to understanding the life history and management of this outstanding game bird. The situation in New York, according to our game biologists, is quite similar. The following is from Director Kimball's summation:

"The male ringneck pheasant is the most beautiful, most sagacious, the cun-

ningest, smartest, most unpredictable and aggravating, slyest, sneakiest, and showiest game bird in the world. He outwits hunters, confuses biologists, delights bird watchers and is admired, loved and hated by farmers. He can outrun a man, and in flight he appears to be a large, easy target but one which is easier to miss than to hit. Even when shot you can't be sure he's dead until you wring off his head and hide it! He has been the ruination of many a bird dog but you really need a good dog to hunt him successfully.

"His complicated behavior pattern has been acquired through countless generations of matching wits with man and his other predators. He has been hunted, netted and trapped for thousands of years in Asia, Europe and America.

"After doing research on pheasants for ten years in Nebraska, Minnesota, and South Dakota, I concluded that the pheasants had learned more about me than I had about them. The one thing we know for sure about pheasants is this: Give them the proper habitat and they will flourish and multiply with apparent disregard for predators, including man and his 12-gauge."

Water for the future

A four-phased program designed to insure that there will be enough water for the American manufacturer, farmer and home of 1975 has been announced by the Water Resources Council, a nonprofit group which combines the efforts of 20 national manufacturing, professional, commercial and civic bodies.

Pointing up the enormous increase in the Nation's water requirements, the Council's announcement states frankly that unless steps are taken *now* to stretch the available supply of surface water, to expand watersheds, to recharge diminishing ground water reserves and to develop a cheap power source for desalting sea water before the upcoming century, stringent growth strictures will be applied to the national economy. Water shortages, once a peculiarly regional complaint, now afflict virtually every section of the country with more than 45 million Americans regularly affected by such shortages.

Industry is today the biggest water user, accounting for 65 billion of the 85 billion gallons daily requirement of Americans for water. Industry's demands are growing apace, not only because of the expanded economy but also because those industries undergoing greatest expansion happen to be the biggest water users. Water economies advocated for manufacturing include recirculatory systems, cooling towers, heat exchangers, and a concentrated effort to eliminate stream pollution which greatly restricts the usefulness of any waterway.

The Council points out that there is growing acceptance in industry for use of waste effluents by manufacturers, taking this useful supply from municipal treatment plants. The steel industries of Baltimore and Los Angeles have been pioneers in this regard.

For the farmers the Council proposes a three-way plan which would substitute farm ponds for field flooding by stream diversion as a source of water for irrigation. Since 1940 nearly 8,000,000 acres of eastern farmlands have come under irrigation for the first time, bringing into conflict the farmer, the manufacturer and the municipality—many of whom contend for their rights under old riparian laws.

Loss of water through transpiration by useless water-consuming plants, notably in the West, is also coming under scrutiny by the conservationists. These seem to draw water from the soil at a rate of "about the square of their uselessness;" a 30-foot shade tree consumes upwards of 250 gallons for every pound of fibre growth. In the West, seven million acres of salt cedars, another useless tree, consume a volume of water equal to the annual flow of the Colorado River, principal supplier of water to scores of small communities and the City of Los Angeles.

Watershed development through an expanded program of local watershed districts can, in a measure, compensate for the loss of much of the country's watershed by urban expansion and large scale public works. In this latter connection the Council reports that the present Federal highway building program will create a runoff amounting to billions of gallons. A mile-long stretch of 20-foot pavement collects about 198 million gallons of water; enough to supply the needs of a population of 4,000 at a per capita consumptive rate of 140 gallons per person.

In the homes, too, there is need for education to discourage the popular view that there is an endless supply of fresh water. The ancient adage, "Waste not, want not" applies here, believes the Council. Municipalities should objectively explore the amount of water which annually falls on its streets and structures, most of which is lost. One author recently estimated that enough water falls on New York's 5,725 acres of airport structures to supply the water needs of 100,000 population.

Desalinization of sea water, a project under development by the Atomic Energy Commission, calls for a cheap power source if it is ever to have practical applications for American industry, believes the Council. Nuclear fission reactors may be the answer, but first must come the large expenditure necessary to lower the unit cost. So far both hydroelectric and steam-generated power costs have proved too great to make such projects feasible except in limited measure.

The Council's National Clean Streams Program, a plan to bring about pollution abatement voluntarily, with incentive awards for municipalities and manufacturers who enlist, is being actively developed by the governors of several neighboring and western states.

There is a note of irony in a quotation given in the opening lines of the Councils' report: "These needs should be met without further dilly dallying or delay. . . . The time for playing with our waterways is past. The country demands results."

These words are from a statement by Theodore Roosevelt, December 8, 1908!

What Do Owls Eat—How?

(*Continued from page 3*)

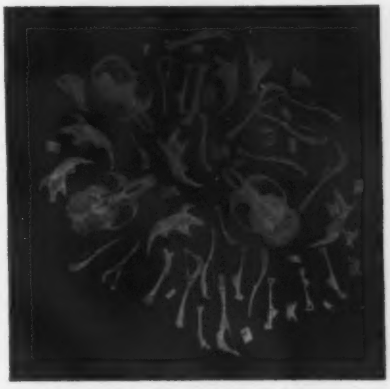


Fig. 12. Bones from shorteared owl pellet

quail and other game. But even these individuals kill more mice, rats, shrews and other small animals than they do game.

Your sleuthing will convince you that condemning all owls because an occasional individual becomes a nuisance is like condemning all men because some individuals are thieves. Just as with humans, individual owls may need control.

Answer: Three meadow mice, two adult females and one immature male. Fun, isn't it?

Thank you

Norman Lorenzo Velocci, now 23, of 48 Gold Street, Buffalo, won't be going hunting in New York State for a while. But that he expects. He was wrong—and has admitted it! And thanked us, what's more, for denying him the privilege!! However, let's get the story in its proper order.

Under provisions of the Conservation Law, the Department may revoke the hunting, trapping and fishing and/or big game licenses, or any one of such licenses, of any person who has been convicted of more than one violation of the Conservation Law, or who has acknowledged such violations for the purpose of effecting a civil compromise, within a period of five years.

Our records indicate that Velocci on January 26, 1953 was charged with hunting rabbits without a license, the violation in the Town of Bethany, Genesee County. The Protector was Leon Nichols. Velocci settled by civil compromise for $27.50

He was also charged on December 17, 1956 with hunting deer without a license and carrying a loaded shotgun in an automobile; the violations in East Otto, Cattaraugus County. R. F. Gordon was the Protector in this case. Velocci settled for this in the sum of $62.50.

Both Protectors recommended revocation of Velocci's privilege to get a license. Velocci was duly notified of the action to be taken against him and replied to Andrew J. Vormwald, Chief, Bureau of Law Enforcement:

"Concerning the revocation of my hunting license: I see no reason why I shouldn't be punished according to the rules of the Conservation Dept., State of New York.

"Like many young men I agree I have went astray of your laws.

"In just punishment I have also been ousted from the hunting club I belonged to under the rules of our charter which states all members must pertain to the rules and regulations of the Conservation Dept.

"If you would be so kind as to letting me know when I again can apply for said license again. Thank you.

"Yours truly.

"Mr. Norman Velocci"

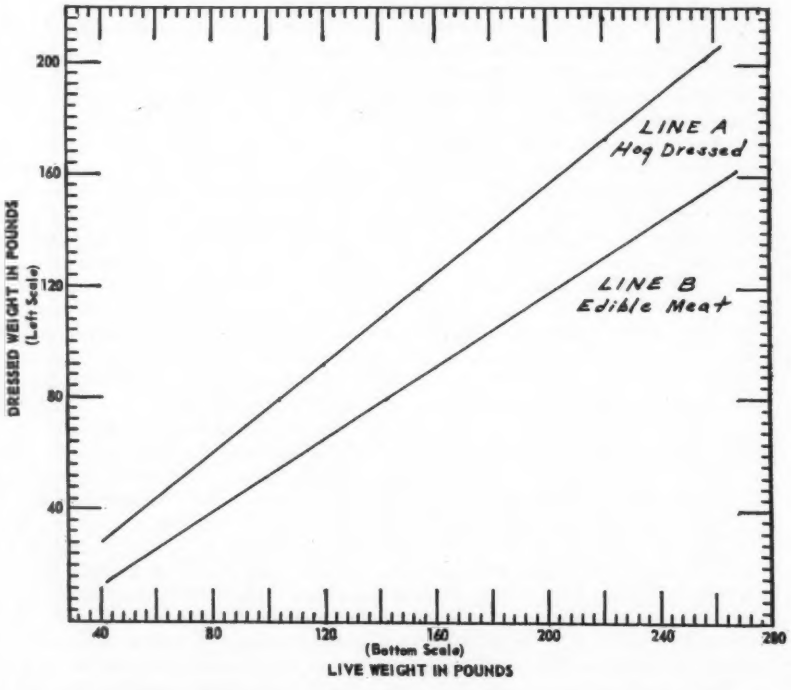
How much does my deer weigh?

So far as we know there's never been a count made of the number of lies told, wild fancies recited and unfounded theories propounded in an average deer hunting camp—but the totals, and frequently, the originators, are staggering.

Of all the subjects that are batted around by the hunters' hot stove league, few get such a going-over as the weight of deer. This is not surprising. A deer that hog-dresses at 140 pounds over on the back side of the mountain will weigh twice that by the time it's dragged into camp!

Well, perhaps we shouldn't spoil the fun, but the Department's game technicians feel there may be some deer hunters interested in figuring out just what they have in weight of deer taken—assuming they can determine at least one *known* factor—live weight, hog-dressed weight or edible meat weight. The accompanying three-way conversion table was developed for that purpose.

GRAPH USED TO DETERMINE THE LIVE WEIGHT, HOG DRESSED WEIGHT AND/OR EDIBLE MEAT WEIGHT OF YOUR DEER IF YOU KNOW ONE OF THE THREE



Hunting at Oak Orchard

The second year of controlled hunting at the Oak Orchard Game Management area near Oakfield has been termed a success. During the 1955 hunting season hunters descended on the area in such numbers that it became a problem of hunters per acre rather than acres per hunter. Hunting was so concentrated that waterfowl were gunned out of the area the first day.

During 1956 and 1957 the number of hunters was limited by permit to not more than 200 in one day and only certain days were open to gunning, giving rest periods for the birds in between. In this way productive hunting has been extended over a longer period and this important waterfowl area has served a much better purpose in harboring birds that feed out to other shooting areas in the vicinity.

In 1957, five days out of eleven (October 19 to October 29) were open to gunning and 989 hunters were issued permits. They took 955 ducks including 486 mallards, 246 black ducks, 78 baldpates, 51 pintails, 43 wood duck, 32 green-winged teal, 11 redheads and 8 miscellaneous including one Canada goose.

Upland game hunting was conducted in a similar manner, but only 186 hunters participated during 7 gunning days. They harvested 40 pheasants, 3 cottontails and 2 woodcock.

The majority of hunters at Oak Orchard drove over 20 miles to hunt on the area. They came principally from Buffalo, Rochester and vicinities.

Oak Orchard has 2,275 acres of which 1,200 is used under the controlled hunting system. The remainder of the area acts as feeding and resting refuge for waterfowl and for upland game acreage.

Hog-dressed Weight

If you know the hog-dressed weight of your deer (heart, liver, lungs and all other viscera removed)—to find how much it weighed on the hoof and/or how much edible meat you'll wind up with:

(1) Locate hog-dressed weight on left scale. (*Example:* 120 lbs.)
(2) Draw horizontal line to meet line A.
(3) Draw vertical line to meet bottom scale. Read live weight off bottom scale. (*Example:* 154 lbs.)
(4) Draw horizontal line from point where vertical line crosses line B to left scale. Read edible meat weight from left scale. (*Example:* 87 lbs.)

Edible Meat Weight

If you know the total dressed weight of edible meat from your deer—to find what the live and/or hog-dressed weight was:

(1) Locate edible meat weight on left scale. (*Example:* 80 lbs.)
(2) Draw horizontal line to meet line B.
(3) Draw vertical line upwards to line A. Draw horizontal line to left scale. Read hog-dressed weight from left scale. (*Example:* 111 lbs.)
(4) Draw from the point determined on line B a vertical line to meet bottom scale. Read live weight from bottom scale. (*Example:* 143 lbs.)

Live Weight

If you know the live weight, to find how much your deer will weigh hog-dressed and/or how much edible meat you will realize:

(1) Locate live weight on bottom scale. (*Example:* 120 lbs.)
(2) Draw vertical line to meet line A.
(3) Draw horizontal line to left scale. Read hog-dressed weight off left scale. (*Example:* 92 lbs.)
(4) Draw horizontal line from point where vertical line crosses line B to left scale. Read edible meat weight from left scale. (*Example:* 66 lbs.)

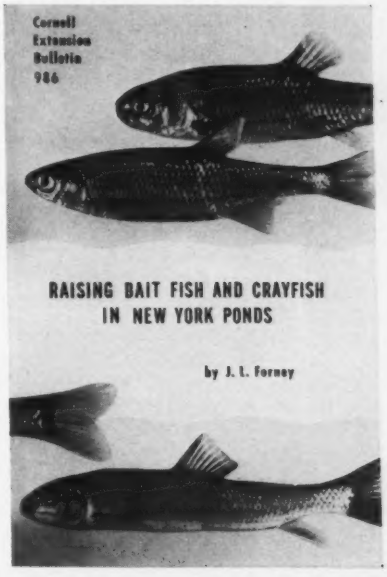
Remember, dressed weights are read from left scale, live weight from bottom scale. Care should be used so that lines drawn are horizontally and vertically square with graph. Weights obtained by this method may vary by 5 lbs., high or low.

Note: We regret that we did not have this material to publish in the October-November issue of THE CONSERVATIONIST, *but even if your venison is all weighed up and stashed away in the freeze locker you can have some fun figuring out what your deer weighed on the hoof.—Editor.*

Dr. Hamilton is continuing his study of these animals and in time he should have a good picture of the biology of these valuable furbearers which can lead to more intelligent management.

Raising bait fish and crayfish

"A generation ago, minnows for bait were easily seined from lakes and streams. Now, however, because of a tremendous increase in the number of fishermen, these natural waters cannot supply angling needs. The demand for additional new sources of bait led the New York State Conservation Department in co-operation with Cornell University to explore the possibilities of raising bait fish in New York ponds. Tests conducted in 90 ponds demonstrated that the golden shiner, fathead minnow and white sucker can be raised successfully in New York in properly designed ponds."



So goes the introduction to a new Cornell Extension Bulletin, No. 986 entitled, "Raising Bait Fish and Crayfish in New York Ponds," by J. L. Forney.

This 30-page booklet, with illustrations and line drawings, gives detailed information on each step—from planning the pond to marketing the production. It should be helpful to those interested in bait as a business and to the individual who wants to be assured of his own bait supply.

The publication is based on studies conducted under the Federal Aid in Wildlife Restoration Program and can be secured from the Co-operative Extension Service, N.Y.S. College of Agriculture, Cornell University, Ithaca.

Northeast Wildlife Conference

The annual Northeast Wildlife Conference will be held January 4 through the 7, 1958 at the Sheraton-Mount Royal Hotel in Montreal. This is the first time that the "Northeastern" will have been held in Canada.

Delegates from eleven Northeastern States, from West Virginia to New York, and six Canadian Provinces are planning to attend along with many individuals representing various educational institutions and organized groups having an interest in fish and wildlife problems.

The technical sessions are scheduled for January 6 and 7 and contain many and varied topics of interest to fish and wildlife workers. The Canadian staff is making every effort to provide an interesting and successful session along with a pleasant stay for participants in and around Montreal.

WANTED: Fisher and Otter

Should any readers of THE CONSERVASIONIST take any otter or fisher during the open season or if they know persons who do, it would be appreciated if they would have the carcasses sent express collect to Dr. W. J. Hamilton, Jr., Fernow Hall, Cornell University, Ithaca, N. Y.

Letters to The Editor

All about trees

Dear Forest Director: I would like to know some information about trees.

A girl in my room wrote to you to know some information about trees. She received her answer, and now she knows quite a lot more about trees.

Could you send me some information about trees? I'm sure I'll know quite a lot more about trees.

I take quite an interest in trees, especially the Oak and Maple.

Annette Britting, Albany

P.S. I think your going great about giving information about trees.

Annette

Water for irrigation

MEMO TO: John C. Thompson, Executive Engineer, Division of Water Power and Control

FROM : Division Conservation Education

John: We receive quite a few inquiries with regard to the drawing of irrigation water from lakes and streams, especially from streams where flow is at a minimum during the Summer months. Many feel the fish and wildlife interests are being jeopardized.

We would appreciate your interpretation of State laws and regulations that pertain at present to the use of water for purposes of irrigation.

Earl A. Westervelt, Sr. Editor

• *As far as I am aware there presently are no New York State laws and regulations relating to use of waters throughout the State for irrigation purposes. Nothing much has been done in the State in regard to the use and value of water for irrigation except in the Long Island counties where it has long been practiced. In the Long Island area the use and value of water for such purposes was recognized early and could be carried forward without too great difficulty since the water was readily available and could be obtained by simply installing a well and thereby tapping subsurface supplies existing under most of the farms in that area.*

In recent years the value of irrigation has been realized by the agriculturists in upstate counties and the practice is now becoming more widespread. The spread of irrigation to the upstate counties has created certain problems. Many farms in these areas have no readily available ground water supplies. In addition, they may not be situated along streams or rivers and thus must obtain water for irrigation from more removed locations. As a result the question has arisen as to how water can be made available for general irrigation purposes. The answer is not simple since matters related to property rights, other water use and needs, economy, etc., are involved.

This problem has been recognized by the Legislature and a Temporary State Commission on Irrigation was created by Chapter 696 of the laws of 1955. This Commission, chaired by Senator Frank E. Van Lare, is considering and studying the problems involved and during the 1957 session certain legislation was introduced for study purposes.

It is possible that in the future State approval of such projects may be required.—John Thompson, Executive Engineer

Reclaimed ponds

Dear Editor: In 1956 I went to the Department's Conservation Camp on Raquette Lake and they told us about reclaiming ponds. I thought it was a very good idea. In your April-May, 1957 issue there was a list of ponds reclaimed in and before 1956. I've only fished in one of these reclaimed ponds, Quiver Pond, namely. This is a good looking pond and after two good evenings of fishing the last week of July we caught four trout. The amazing thing about this is we also caught two 12-inch bullheads, one 7-inch perch, and 20 or 30 chub.

If all the 74 ponds mentioned are the same as this, the reclamation is very incomplete. I'd like to know the story on reclamation of the ponds in this State; especially, Quiver Pond.

Dave Clark, Herkimer

• *The bullheads and chubs you caught in Quiver Pond could have survived the 1954 treatment. The yellow perch you caught in this pond is another story.*

Yellow perch, bass, northern pike, pickerel, rock bass, etc., have been eliminated in the 74 ponds treated to date. This has been checked by test netting or angling results over the years. While I would not make the categorical statement that they can always be eliminated, experience indicates we can reasonably expect their elimination in the type of ponds we operate in. We have had three ponds where yellow perch have reappeared due to barrier dam failures. One of these ponds was Quiver Pond. In two of these waters, it is interesting to note that perch did not reestablish themselves successfully, as netting and angling has not captured any in the last few years.

Since reclaiming Quiver Pond in 1954 the barrier dam on the outlet was breached twice. Yellow perch (and perhaps chubs) entered the pond. At this writing the barrier dam has been repaired and the pond retreated. We hope that Mr. Pesky Perch has lost his membership card to the piscatorial lodge in Quiver Pond.—Robert G. Zilliox, District Fisheries Manager, Adirondack Fisheries District

Tulip tree scale

Dear Editor: I have a tulip tree and although I have no idea of its age, the trunk is approximately 12 inches in diameter at the base. Until last year, the tree had always been healthy and had an abundance of foliage. Last year, however, the tree was attacked by some form of disease. First, a number of growths about the size of a small pea appeared on several branches. These growths were sometimes in clusters and sometimes alone. Next, a black residue dripped from the attacked branches until the lower leaves were almost entirely covered and the ground under the tree looked as though used crankcase oil had been poured on it. Last, a great many of the branches attacked died. In previous years the leaves were large and well formed but this year they have been considerably smaller and many have shown a tendency to curl downward at the extreme points.

Can you tell me: 1. What is causing the attack on the tree? 2. What can be done to stop it?

Everett M. Johnson, Fishkill

• *The insect found on the specimen is the tulip tree scale. For your information we quote the following from the book "Insects and Diseases of Ornamental Trees and Shrubs," by Felt and Rankin.*

"The tulip-tree scale Toumevella liriodendri *is a serious enemy and also one of the largest scale insects. The pest may become so abundant as to cover the underside of the smaller branches with thickly placed scales and in mid-summer, the lower leaves of badly infected trees and the foliage of other plants below may be badly spotted with copiously excreted honey-dew in which a sooty fungus develops. There is also a somewhat unpleasant odor to badly infected twigs. The Winter is passed on the underside of limbs as small inconspicuous partly grown scales, approximately 1/16 inch long. The young appear late in August. Dormant spraying with miscible oil, one part to fifteen parts of water, gives excellent control."—C. J. Yops, Superintendent, Bureau Forest Pest Control*

Rebuilding the land

Clayt Seagears: Just a few lines to let you know I certainly enjoy your pictures in THE CONSERVATIONIST. The struggle you have in making Bootstrap Farm, I can appreciate. I also have an old farm of 206 acres in Broome County and am endeavoring to make a stab at reforestation and a farm pond.

We have about 45 acres of heavy timber and the rest is hayfield, briars and brush of sorts—and plenty of rocks and gulleys. Now we have our own fish pond, 100′ x 100′ x 4′ deep near the house.

The children and I have planted 6,000 trees—red pine, Scotch pine and spruce. We are rather limited in means but not in ambition.

I have good intentions of reforesting 40 more acres of brush and old pasture to make a place for animals and people to enjoy that come after us.

We here feel pretty proud of our old place. The rabbits have appeared on the scene and other game birds and animals since we have entered in conservation practices.

Larry B. Thompson, Johnson City

• *We have the land and the opportunity. All we need is more "Larry Thompsons."*—Editor

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Whitefish mortality

Dear Sir: I am enclosing a picture of a whitefish which my son picked up on Sacandaga Lake in the Town of Lake Pleasant. This fish was laying on top and then at times he would dive down in the water but he could not stay down. The fish weighed 4½ pounds and was about 24" long. We have from time to time seen these fish dead on top of the water and wondered what was killing them. When my son brought this fish in we decided to cut him open and see if we could see anything wrong with it. Its stomach was bone dry. I kept the stomach, lungs, liver and heart. I have them frozen. I would like to know who I could ship them to so we could find out what is wrong with this fish also if this could be what is killing them off in our lake.

These fish are fun to fish for and we hate to see them dying off.

Mrs. William Girvan, Utica

• *The information in your letter of Sept. 19th to our Albany office, and the frozen viscera of the whitefish you forwarded to this office on Oct. 31st, have been analyzed.*

The viscera of the fish did not show any particular abnormality or condition which could be attributed to an infectious parasite. However, your description of the actions of the fish—surfacing and making a prodigious effort to return to the depths—are indicative of a condition that appears occasionally in Lake Trout which display the proclivities of the whitefish in their preference for the deeper, cooler water of a lake. When a fish, such as one of these species, is suddenly brought to the surface by efforts other than its own, its swim bladder is distended abnormally because of pressure changes. This condition lends great buoyancy to the fish and in spite of itself it cannot return to the depths as long as its bladder is filled with air. Furthermore, the fish is not equipped physically to expell the air from its bladder fast enough to allow its return to the cooler depths. Death usually ensues because of physical exhaustion and the physiological stress exerted on the fish by the warmer surface temperatures of the water.

This is one explanation of the phenomenon you have observed. How the fish gets to the surface "by effort other than its own" is not easily explained. More often it has been brought up by a fisherman, and before it can be boated, the fish escapes from the hook.—Richard Stevens, Sr. Fish Pathologist

Case of the ribbed mussel

Dear Editor: We are wondering what is killing the mussels this Summer. The waters were heavily sprayed with D.D.T. We protested to Washington. They are coming in thousands and we are carrying them up to put on our road. This condition is on Shinnecock Bay, Suffolk County.

Mrs. E. McCarthy, Hampton Bays, L. I.

• *We are aware of the situation you describe and made an inspection in the area several weeks ago. However, we have not been able as yet to determine the cause of this mortality which, incidentally, resulted in the death of approximately 95 per cent of this species of mussels commonly called ribbed mussels or* Modiolus demissus plicatulus. *We can report, though, that preliminary analyses do not indicate an absorption by the animal tissues of these mussels of insecticide.*—Harold F. Udell, Marine Fisheries Sanitarian

Barracuda

Dear Editor: On September 10th, while fishing for snappers from a dock at East Quogue, Long Island, the little fellow whose picture you will find enclosed took my hook. Also, before I realized what I had he almost took my finger.

This painting is exact size but I could not do justice to the beautiful iridescence of the fish when he came out of the water.

I believe it is a Pacific Barracuda. The fish is still in the freezer of the tackle shop at Hampton Bays, Long Island, the proprietor of which said he would show it to someone from the Conservation Department.

It seems to me this one is far from home.

George Savo, Mt. Vernon

Northern Barracuda

• *Your letter of October 3, with the description of the ferocious small fish that you took while fishing for snappers this Fall off a dock at East Quoque, Long Island and the supporting illustration (and a darn good picture it is), leaves no doubt that your fish is a Northern Barracuda.*

Nichols and Breder, in a booklet entitled "The Marine Fishes of Southern New York and New England," published by the New York Zoological Society, describes this species as being a regular Summer visitant to the waters of the Northern Atlantic States. He notes that it is recorded at Orient, Long Island with a few being taken from June 20 to November 12. The range of the species along the Atlantic Coast is from Cape Cod to Cape Fear. Its food is described as small fish and gastropods. He finally states that the species may reach a length of "12 inches, rarely more."

The scientific name of the species, if you are interested in looking it up in reference books—is Sphyraena borealis.

Incidentally, I caught one of these fellows back in 1938 while fishing off the breakwater at Three Mile Harbor, East of Amagansett. This is one reason why your painting impressed me as being such a good likeness.—Editor

S.C.U.B.A.

Dear Editor: Congratulations on a fine article on S.C.U.B.A. diving. I feel strongly that the inherent dangers should be well publicized. As a graduate of the Naval School, Underwater Swimmers, Key West and an active diver in my job of Explosive Ordnance Disposal, I commend you on a well written article.

I am off to two-year duty in Japan but my outdoor heart still lies in New York State and I shall look forward to each copy of THE CONSERVATIONIST as a vital contact with my homeland.

Robert B. Youher, Ensign U.S.N.R., 'Frisco

Beer can brigade

Dear Sir: This note is to tell you how much my husband and I enjoy "The Great White Stag of Whiteface Mountain." The idea of a Litter Vigilante Brigade to stop the defacement of the landscape is well camouflaged in your article, but the message is clear.

I wish that something could be done about those who drop beer cans all over along the highways (and along our farm fences). The shutterbugs are just as bad with their film boxes littering every scenic place.

Lucille K. Bertram, Montgomery

Inter-state angling

Gentlemen: Can you supply me with the answers to the following questions?

1. If I have a New York State non-resident fishing license, can I legally fish in the Delaware River between New Jersey and Pennsylvania?

2. If I have a New Jersey resident license, can I legally fish in the Delaware River between New York and Pennsylvania?

3. If I have a Pennsylvania non-resident fishing license, can I legally fish in the Delaware River from the New York and New Jersey shore. (Fish from the banks of the Delaware River on the New York and New Jersey side.)

4. As a holder of a New York State non-resident fishing license wishing to operate an outboard motor on the Delaware river, must I obtain an operator's license?

5. As a holder of a New York State non-resident fishing license, is there any specific location where I must have an operator's license to operate an outboard motor, or obtain license plates to place on a boat on which an outboard motor is being used?

Answers to above questions will be greatly appreciated.

Stanley Chaplin, Lyndhurst, N. J.

• *1. A New York State non-resident fishing license would allow you to fish legally in the Delaware River between New York and Pennsylvania but not between New Jersey and Pennsylvania.*

2. A New Jersey resident license does not allow you to fish legally in the Delaware River between New York and Pennsylvania.

3. With a Pennsylvania non-resident fishing license you would be able to fish legally in the Delaware River between New York and Pennsylvania and between Pennsylvania and New Jersey.

4. According to information available here, no operator's license for operating an outboard motor on the New York waters of the Delaware would be required.

5. In general, in the inland waters of New York State, out-of-State residents may operate power driven boats for a period of ten days without licensing the boat. Beyond that period of time a boat permit, available from the New York State Department of Public Works, is required for the next 30 days. Such a permit is issued free of charge. —C. W. Greene, Chief, Bureau of Fish

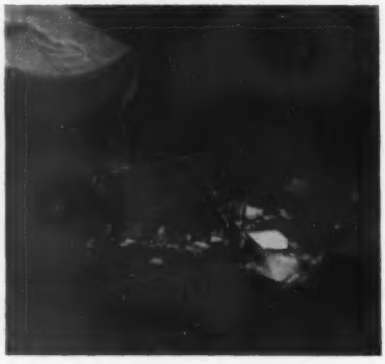
Old mills

Mr. Drahos: Read with a great deal of interest your article on the old mills of New York State. Strange as it may seem, my family supplied some of the flour mills to the Red Mill (Claverack) from 1817 to 1898. I am the son of Countcil Munson of the firm of Munson Brothers of Utica who manufactured the Munson flour and feed mill which was originally invented by my great-grandfather, Alfred Munson, and my grandfather, Edmund Munson.

The original mills or factory was built on both sides of Broadway along the side of the Erie Canal, Utica, then opened, in 1817. I saw three of the flour mills in operation, in about 1935, in the Red Mill and had a long talk with the owner and operator whose name I believe was Lampman.

Different improvements were made by my family. My father was the engineer and general manager while my uncles handled the purchasing and financing. My father was also the manager of sales. He died in 1898 and the business was carried on until 1917 when we had to close it.

Charles C. Munson, Copake



Campmate

Dear Sir: On September 6, 1957 I read the story in our *Post-Standard* morning paper about—biggest black bear prowls Adirondacks. That one was in the Tupper Lake area. Then I read on about the second bear taken at the Blue Mountain Lake village dump.

Now, I want to tell you about a big black bear who visited us while we were camping in a tent at the Golden Beach campsite on Raquette Lake. Just my daughter and her friend and I were camping for our two weeks' vacation.

We closed up the tent for the night and went to bed about 9:30 p.m. I had a 6-foot folding aluminum table outside the tent underneath the porch roof. Dishes and canned goods were on this. This area was all inclosed with a netting. My ice chest and 2 lbs. of bacon in this chest, along with some other food.

About 10:30 p.m. some dishes were knocked off the table. We went out and picked those things up but couldn't see a thing as it was so dark. In another hour the ice chest was tipped over—the handle was twisted so as to open the cover. Well, half of my ham was taken. We thought it had been a raccoon before, but not now. We undid the tent and straightened things up again. So we thought that would be it for that night. Well, 12:30 a.m. came along and so did our friend. IT came back again —his body rubbed along the side of the tent. I gave a scream *"GET OUT OF HERE"* and it went away without doing anything that time.

I have a station wagon and had it backed up near our tent under some trees. At this point—after three visits—we grabbed our bedding and got into the car for the rest of the night. So we settled down again.

At 3:15 a.m., *CRASH*—We turned on our searchlight and here is this huge black bear. We watched him put his great big paw up and come right down the side of the tent where the netting was attached, ripping that off and tipping the aluminum table over —the dishes and everything went flying. We kept the light on him for a good half hour, it never bothered him one bit. On the third try, we had brought the ice chest inside of the netting. So now, he drags the chest out about 8 feet to the picnic table where he opened it again—took out the other half of my ham and ate it just a few feet away from us; also ate the 2 lbs. of bacon. He took out lettuce, tomatoes, hot dogs and just crushed them into the dirt. Now, he is rather thirsty, so he tipped over a container of apricot juice into the bottom of the chest and stood there and lapped that up. We were sitting in the car watching all of this going on and couldn't seem to do anything about it. My daughter's friend got over into his car and he started the motor and raced it, (he has the dual mufflers) and that noise drove the bear away. When the bear was down on all fours his back was higher than the picnic table.

You tag them and try to keep track of them, maybe learning of some of the things they get into. Well, this has been a story of only one, so, thought I would let you know about it.

We have camped so many years at Raquette Lake and never had seen a bear around. This incident will not spoil any future trips there, for we love the woods. We stayed out two weeks. This all happened the first week-end we were there.

Mrs. Howard Young, Syracuse

• *For the latest on Bruin, see "The Bears and the Biologists,"* THE CONSERVATIONIST, *October-November, 1957.—Editor*

Fire extinguisher

Gentlemen: While on a recent extended motor trip through the Provinces of Ontario, Quebec and New Brunswick, as well as the New England States, we discovered a method of extinguishing our lighted cigarettes and cigars with the least possibility of the sparks flying, while riding along the roads.

Throughout our trip we noticed thousands of acres that were burned to ruin. This in spite of the numerous road signs that keep reminding the motorist of this danger to our forests. We decided that we were going to do our part at least while we were in the thick of it and discovered this very practical and safe method.

We filled our ash trays with fine sand and this enabled us to just dip the tip of the cigar or cigarette into the ash tray and immediately it was out. *No sparks—no ashes*—and even in the wind with the windows open wide.

I am still using this same idea even while travelling in the city. It works just as well and there is no mess as immediately after the cigarette is out it is very easy to dispose of it merely by picking it out of the ash tray and throwing it into a paper bag or whatever you may have with you at the time.

Ed. J. Johnson, Flushing

• *A good idea—just as good in New York as in Canada or the New England States.—Editor*

About Boletus

Dear Editor: Early this year, I wrote to you about the European hare which letter I was very pleased to read in the June issue of your very fine magazine.

Now, I am writing to you about a subject which I think your botanist should discuss in THE CONSERVATIONIST as beneficial information to your numerous readers: Mushrooms.

To repeat, I was born and raised in a picturesque little village high in the Ligurian Apennine mountains; namely, Rezzoaglio, where mushrooms constitute, as in many other towns and provinces of Northern Italy, a substantial financial resource.

Properly sliced and dried, they are bringing into the most prosperous parts of the world their unequalled fragrance which enhances the best of meals (very similar to Truffles). I am referring to various species of the Boletus family.

In Italy these mushrooms grow exclusively under chestnut, beechnut and oak trees during May and August moons. Of course, there must be rain. The ones harvested in May are called Summer mushrooms, and are very delicate and not durable. The ones harvested in August are called Autumn mushrooms, and if kept dry or in refrigerated places, maintain their fragrance for several years.

In this country, we no longer have chestnut trees, but our oak and beech forests produce during the same period a fantastic amount of these exquisite Boletus edulis (*Fungos porcino*). Most all of these mushrooms go to waste.

They are a little inferior in fragrance and aroma to those coming from Italy, for no botanical product is equal in perfume and aroma to the ones growing in the Mediterranean basin. Naturalist Comba attributes this fact to the influence of the warm African winds (Sirocco), which at times reaches up north to the base of the Alps.

I enclose a few slices of each kind. Please take a sniff of both. You will find the same pleasant aroma, but the ones from Italy will be a bit stronger. Incidentally, they sell in the New York area for about $10 a pound. I found the American variety in the Croton Lake region of New York.

Bolerus edulis—from Italy, Top, and from Croton Lake, bottom

Of course, I am well aware of the danger involved by encouraging mushroom picking. But of the Boletus family, only one, the *Boletus Satanas*, contains a certain amount of poison. Nature, however, has put a warning sign on the Satanas that cannot possibly be confounded for a good one. Just by slicing one, it immediately turns green.

All of the Boletus are very easy to distinguish for they all have pores or tubulos underneath, while all the other kind of mushrooms, including the poisonous ones, have grooves underneath, such as the deadly amanita, fly amanita, destroying angel, etc.

I would be very glad in hearing your competent opinion of this subject.

Ettore Neri, Bronx

• *Our competence on mushrooms is limited to the pasture, pink veined variety. However, we sniffed the Italian and the Croton Boletus (Boleti?) as directed and, sure enough, they both smell fine; the Italian importation a little more pungent.—Editor*

Plantation thinning

Dear Sir: I would like to ask some questions about the action of the State in "thinning out" the trees that were apparently a part of a reforestation project near Oak Ridge (Montgomery County).

I ask these questions because while walking down a lane off the dirt road that runs from Oak Ridge to (I think) Burtonsville, I saw a few cleared "trails" running diagonally to the land, but mostly the areas on both sides of the lane were choked with "squaw-wood," down limbs, etc., making a fine place for a match or cigarette. I think that lightning might even start a fire there.

On the other side of the road is a combination of thick brush that can't be traveled through and a few cleared "fields" containing some over-picked blueberry and huckleberry bushes.

I would like to know this: Why in blazes doesn't somebody do something about this? My uncle tells me that this section of State land is good bird country (I saw a woodcock that presented me a perfect target) but one can hardly negotiate carrying a berry pail, much less a shotgun.

Doral H. Teetz, Sidney

• *We assume that you are referring to thinning operations being carried on in our plantations, not only in Montgomery County but in most of the thirty-one counties in the State where this program has been established.*

At the time of planting these coniferous species (softwoods), the seedlings were spaced at 6' x 6' intervals which amounts to approximately 1,200 seedlings to the acre. After a period of from 16 to 20 years (depending upon the species and site factors), the plantations must be thinned out to avoid stagnation (slowing down of growth). At this stage we thin or reduce the number of trees per acre to approximately 700-750 trees. A second and third thinning takes place at eight-ten year intervals thereafter until each acre is finally thinned to approximately 200 trees to the acre, constituting the final crop tree stand

At each thinning the branches of the soft wood species are cut from the bowl or stem and scattered on the floor of the plantation where they rapidly break down and disintegrate, thus returning some nutrition to the soil to aid the growth of the remaining trees. This, in brief, is the explanation of our methods and reasons for plantation thinning.

As to the fire hazard created by this operation may we say that during extremely dry seasons of the year there is some possibility of loss in these plantations by fire. However, with our own fire prevention facilities including fire lines, truck trails and water holes combined with the constant vigilance of the Rangers from the Bureau of Forest Fire Control, we have experienced very few fires and little loss over the past twenty-five years.

We might add that we are constantly asking for the co-operation of the general public who use the State Forests for hunting and fishing to use extreme care while in the forests in the matter of disposing of their matches and cigarettes. Under the right weather conditions one careless smoker could start a fire that might destroy thousands of dollars worth of State (yours and all other citizens') property, as well as cause untold damage to wildlife such as grouse, rabbits, deer, etc.

We are sure you realize that the responsibility for the protection of these State Forests rests with you and every good citizen as well as with the Conservation Department. —C. D. Kingsbury, Supt. State Forests

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Pine needle scale

Dear Editor: I am enclosing a few Scotch pine needles. Would you identify and prescribe a remedy for the condition?

William R. Darling, Rush

• *The specimens are infested with pine needle scale,* Phenacaspis pinifoliae.

We enclose a copy of the New York State College of Forestry leaflet on the "Pine Needle Scale" which contains valuable information on the life history and control of this insect.—William E. Smith, Forest Pest Control Foreman

Pitfalls

Gentlemen: On several occasions in the course of my work, I have noticed open wells on abandoned private lands. Dead animals are more often than not found in the bottom. I presume they have fallen in by accident, as only silly humans have reason to commit hara-kiri.

At any rate, after almost finding myself at the bottom of several of these wells, it occurred to me that if animals roaming the wilds day and night were trapped, how much easier it would be for an unsuspecting child. There are accounts written of children locking themselves in old refrigerators and suffocating to death in consequence. If children will go to so much trouble to get in an abandoned refrigerator, how easy it would be for them to stumble into an old well, camouflaged by tall grass and weeds.

Even though I never heard or read of a child falling into an open well, I could not but note the danger involved and thought if a letter printed in your very good magazine would tend to make people a little more conscious of the danger, perhaps some wells would be filled or covered. It is better to practice safety and perhaps save a life, than to lose a loved one through carelessness.

C. H. Hebdon,
Forest Pest Control Foreman

• *We agree.—Editor*

Lake Colden Trout

Dear Sir: I recently made my annual pilgrimage to the Flowed Lands-Colden country (my first trip was in 1926) and had the weird, rather interesting experience of walking dry-shod over the bed of the Flow, drained for repairs to the new dam. The configuration of the original pre-historic channel was intriguing, in spite of the devastated appearance of this former trout lake. Many are the pink fat, bright-enamelled speckled trout I've taken there in the past, before the loss through flood of the original dam—the start of a new era in the Flow's history.

After the draining due to flood, several years elapsed before one could take trout of any size or number on flies, and the two-three- and four-pounders seemed to have gone, possibly lost through the old drain's failure. Now, with another drainage, a similar period of restoral to productive fishing may be expected. Thousands of insect eggs and larvae must have perished in the dried bottom, but the latest draining should not have lost fish from the lake, the dam grill being tight enough to prevent this.

The mystery of where went the Flowed Land trout while it was drained puzzles me. With water of any depth only in the lower neck, it would seem that the trout would be concentrated there. With reduced feeding area, they should have been hungry this year. Yet no sign of surface feeding could be detected, and no response to either fly-casting or worm fishing. Could any of your aquatic biologists explain this?

Incidentally, Ranger Chet Rafferty (long may he stay at Colden) stated that Lake Colden had produced very few trout this year. This also is puzzling, as I'm sure there are still plenty of fish there, and of healthy size.

R. W. Brigham,
Haworth, N. J.

• *Your comments on the trout fishing in Lake Colden and the Flowed Lands are very interesting. Your questions relating to the status of the present trout fishery are difficult to answer. I have recently read a book which in part concerns itself with fishing in these two waters, as well as Avalanche Lake and Livingston Lake in the early Nineteen Hundreds. As you might imagine, fishing then was excellent and similar to your experiences in the Twenties.*

One can only speculate as to the disappearance of brook trout this year in Flowed Lands. However, it is possible that a drastic change in habitat caused by the draining of the pond to the old channel this year, in some manner adversely affected the trout. I walked into Lake Colden and Flowed Lands on September 19 of this year and saw no sign of trout activity on this date. Ranger Chet Rafferty is keeping watch to see if the annual spawning run of trout takes place in these waters this Fall. To date, no trout has been observed.

Both waters have been stocked by airplane this Fall. Now that the dam repair on Flowed Lands is completed and water level within a foot of top of spillway, perhaps Flowed Lands will once again come into its own in the next few years.

To further our knowledge on Flowed Lands and Lake Colden, as well as Livingston and Avalanche lakes, we hope to conduct biological surveys on these waters during 1958.—Robert G. Zilliox, District Fisheries Manager, Adirondack Fisheries District

Scholarships

Dear Editor: On March 25, 1957 the Sons of Italy Lodge, No. 321 Fish and Game Club of Schenectady played host to school district faculty sponsors and 50 boys from the Schenectady Junior High Schools at a dinner. The purpose was to encourage youngsters to compete for the conservation camp scholarships being made available to them by area organizations through the Schenectady School System.

We are deeply grateful to Mr. Asa Smith, District Game Manager, of the Wildlife Research Laboratory, Delmar, who was the principal speaker.

Reports received from school authorities indicate that as a result of the affair, interest and enthusiasm for the conservation camp program were reflected in discussions held the following day in school.

We feel that as a result of the success of this affair other conservation groups throughout the State should be urged to inaugurate similar programs. We will be happy to assist in any way possible. Detailed information may be secured by writing to our organization.

E. B. D'Alessandro, Chairman
Conservation Education Committee

• *We are extremely pleased to have your letter of April 30 and to learn of your success in creating interest in co-operation with the faculty of the Schenectady Junior High School in the sponsorship of boys from the area for the Department's conservation education camp program.*

We think that the scholarship idea is an outstanding contribution — particularly as handled through the school system—and we are pleased that the affair went off so well. We agree that the work you have undertaken in this effort could be copied successfully by other sportsmen's groups.—Editor

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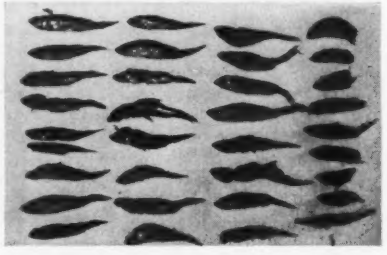


Fish eater

Dear Editor: The enclosed photo shows 34 yellow perch that were taken from the crop of a drake mallard duck. I know that they do eat fish on occasions but this seemed rather unusual. The duck was shot on Lake Delta, Oneida County near Westernville, on October 20, 1957 by George Olney, Jr. of Westernville. When he started to clean it and found these fish he called me to ask if it wasn't rather rare to find a mallard feeding on fish. When I saw how many he found and the good shape they were in I thought it might be worthy of note. He had another mallard that didn't have any in it.

Lake Delta has been drawn down very low this Fall and I suppose the fish were trapped in a shallow pool and were therefore available to a shallow feeding duck. Maybe we have a substitute for rotenone!

Howard J. Dean, Aquatic Biologist

• *I can guess how this one tasted.*—Editor

All's well

Gentlemen: I wish to report catching Black Bass CU 2451 last Summer on Dakins' Shoals—3 miles out from Constantia.

It weighed 3¼ lbs., was 16½ inches long. It was caught with a spinning rod, 5.8 lb. test line with a Wob-l-rite lure.

It took the lure at the extreme end of a long cast, did all the nice things a bass is supposed to do and so all was well with the world.

H. Walter Hower, Cleveland (N. Y.)

• *Thank you for reporting the capture of a fish carrying tag number CU 2451. This fish was tagged on June 20, 1957 and released at Constantia, Oneida Lake. The fish was 15.9 inches long when released.*

Information on tagged fish is used to determine the movements, rate of growth and percentage of legal fish harvested each year. Your interest and co-operation are much appreciated and are essential to the success of our fishery program.—John L. Forney, Biologist in Charge, Cornell University, Biological Research Station

Some Catskill lakes

Dear Sir: I'm a resident of Pennsylvania but fish New York with a non-resident license and I must say that I enjoy it very much. I fish mostly in Sullivan County and would like to know if you have maps of the following lakes in that county: White Lake, Swan Lake, Swinging Bridge Reservoir, Highland Lake, Black Lake and Toronto Reservoir. I understand that there is state fishing rights on Highland, Black and Toronto.

What I would like to know about these three lakes is: Is it possible to put your own boat on these lakes to fish with or do you have to have a permit from the State? Or do you have to pay someone at the lake? I have my own boat and trailer and won't leave it at the lake.

Teddy Androkavitz,
Scranton, Pennsylvania

• *The best large scale maps are those put out by the U. S. Geological Survey. For the area in which you are interested, you will need the Monticello and White Lake quads. These maps can be obtained from the U. S. Geological Survey, Washington, D. C. for 30 cents each.*

Detailed information on most of the lakes in which you are interested is contained in "A Biological Survey of the Delaware and Susquehanna Watersheds," published in 1935 by the New York State Conservation Department. Unfortunately, this volume is now out of print. However, several libraries in the area as Binghamton, Liberty, etc., have it.

At the present time we do not have fishing rights on any lakes in the Catskills. Swinging Bridge Reservoir and most of Toronto Reservoir have recently been made available to the public through the courtesy of Rockland Light and Power Company. I believe it is possible to launch a boat on these waters.

Our information on Highland Lake and White Lake dates back two years. At that time, there were launching sites. During the busy Summer period, it may be necessary to pay a boat livery for launching privileges especially at White Lake. Black Lake is pretty well restricted and you will pay a fee for launching privileges at Swan Lake. —Cecil E. Heacox, District Fisheries Manager

Prescription for a long life

Dear Sir: Enclosed please find a picture of the bridge across Mud Lake stream on the trail from Cedar Lakes to West Canada Lake. Forest Ranger Jim Lawrence (standing) built this bridge in September, 1956. He is stationed at West Canada Lake.

I thought it worth publishing as he built it all alone at the age of 62 years. The top logs are 32 feet long and 8 feet above the water. At times the water comes nearly that high.

Mud Lake stream is the outlet of West Canada Lake flowing into Mud Lake, the head waters of West Canada Creek. No transportation other than by 'plane.

Ray S. Aldrich, Sherburne

• *A substantial piece of construction and a pretty good testimonial to the healthful influence of his living all these sixty-two years in the Adirondacks.*—Editor

Re porkies

Dear Editor: I read V. B. Garrison's letter re porkies with interest. May I suggest the use of Carbasota? It's a mixture of carbolic acid and creosote and porkies hate it. I have used it on barn doors, etc. with great success.

In fact, although porkies love linseed oil, I use half Carbasota and half linseed. It preserves the woods and they won't touch it.

Harold H. Boswell, East Dorset, Vt.

Dear Sir: I read your article, "Porcupine Damage," in the December-January, '56-'57 CONSERVATIONIST, sent in by V. B. Garrison, Caldwell, New Jersey and would like to give you a wonderful formula. We tried it with terrific results.

Take ground hot red pepper or cayenne pepper also ground; mix with paint—the more the better—(pepper, of course) or mix with linseed oil and paint whatever should be protected. There will be no more trouble. You can easily find out by yourself how it works. Just paint a piece of wood with the saturated paint or oil; let it dry; then take a bite.

The application will stand up like paint for years—practically. You do it once, because the pepper settles in the crevices of the wood. We painted our shack with a solution of crankcase oil and pepper about ten years ago and had no more trouble since.

The beauty of it is, it does not harm the animal. It only goes off like greased lightning. I hope it will work for Mr. Garrison.

Fred Wolfmayer, Long Island City

• *Sound like sure-fire methods.—Editor*

Stain

Dear Editor: Will you please tell me what you have put on your log buildings on the campsites and other State property? I have been told it is creosote but that has such an odor and I never smell any odor on your buildings.

I have a log-sided house and would like to treat it as you do your buildings.

Gordon W. Snyder, Palatine Bridge

• *The stain which we use on buildings at the public campsites is made of linseed oil and burnt umber. The porportions vary from ½ pint to one pint of burnt umber to five gal. of raw linseed oil. The exact proportions would depend upon the particular shade of brown you wish to obtain.*—W. D. Mulholland, Supt., Camps and Trails

Federation project

Dear Sir: The Cayuga County Federation has decided to place THE CONSERVATIONIST in all the county elementary schools as well as the junior and senior high schools. There are 24 elementary schools and 9 junior and senior high schools making a total of 33 schools, for which a check in the amount of $66 is attached along with a list of the schools.

Will you please identify the subscriptions as having been sent "Courtesy of Federation of Conservation Clubs of Cayuga County?" Thank you for taking care of this for us.

W. P. Schermerhorn, President,
Federation of Conservation Clubs
of Cayuga County

Credits

First, second, fourth covers, pages 24, 25, 38, H. Wayne Trimm; 2, 3, 39, LeRoy C. Stegeman; 4, 7, 14, 15, 18, 19, 28, Roy Irving; 5, A. C. Petty; 6, N. Y. S. Museum; 8, Fynemore Studios; 10, William G. Bentley; 12, Carlita N. Georgia, W. J. Hamilton, Jr., Leonard Lee Rue III; 13, Hamilton; 16, Watertown Daily Times; 17, Larry Pringle; 20, 21, 22, Jos. Dell; 26, Rue III; 27, Dave Allen, Rue III; 29, Howard J. Dean; 30, Penn. Fish Com.; 33, Earl McGuirk; 34, Arthur Phillips; 35, J. J. Eckert; 36, Rome Daily Sentinel; 37, Tony Taormina; 40, Chappaqua Sun, Irving; 41, Fred Chambers; third cover, Clayt Seagears.

The Saga of Siam's Siamba

A highlight in New York's animal annals for 1957 was the Great Elephant Hunt in the Catskills.

It began when three circus elephants, being watered in a creek, were stampeded by a frolicsome horse. Two of the elephants soon were recaptured by Alfred Vidbel, their trainer. But the third beast, a 2½-ton, 13-year-old cow named Siam, disappeared into the mountains. For thirteen days she marched along the wild ridges, mostly in the Greene County Township of Windham on the northern boundary of the Catskill Forest Preserve. Finally, weary, hungry and with a cold in the head, she came down into a valley and meekly gave up.

Meanwhile, Vidbel, who had been greatly concerned with the safety of his valuable charge, appealed to the State for help and the Conservation Department entered the picture. District Ranger Victor Schrader was ordered officially to recruit some of his men and help as best they could.

Now it so happens that the State of New York has a very active Division of Safety. This Division requires that in the event a State employee is injured sufficiently in line of duty to receive first aid or medical treatment, the immediate supervisor of said employee shall fill out Form BSAP-4 entitled Supervisor's Investigation of Accident or Occupational Disease.

So on October 29, District Ranger Schrader dutifully answered all but one of the 27 questions on Form BSAP-4 required to state the case of Ranger Coral Couchman of Catskill injured, the report disclosed, in official line of duty while "elephant hunting."

According to this document, it seems as how Ranger Couchman, elephant hunting alone, caught up with Siam several hours before she finally submitted to capture. Being a resourceful Ranger, Brother Couchman actually succeeded in getting a line aboard the beast, whereupon he suffered "a rope burn between the thumb and index finger of the right hand."

In answer to Question 19 and 21, the injury was attributed to lack of knowledge and experience in handling an elephant at the end of a rope; but neither Couchman nor Schrader could come up with a logical answer to Question 22. This seeks to determine what corrective action might prevent a repetition of the particular kind of accident involved.

Now it is an extremely trivial type of official report these days which does not require at least one additional report on the report. So—since a point regarding mammalian behavior entered the report in question, it seems appropriate for this investigator to get into the act. We now are pleased to disclose that there was a lot more to Siam's adventure than the press revealed and, also, we are able to contribute the answer to Question 22.

Attached pet-wise to the Secretary's office of the Catskill Region Resort Association is a queen Siamese cat. Being a normally independent feline, she travelled many miles one day early last October to the crest of a mountain where she produced her five kittens in a small rocky cave. Several days later while this queen was out slinking around for deer mice, a Stewart Field jet plane cracked the sound barrier overhead. This jarred a loose rock at the cave's entrance so that it tightly blocked the hole. The cat soon saw that nothing short of an elephant could move that rock.

The mother Siamese wasted no time. She ran straight to the farm where she knew Siam was spending time between shows. She also knew that elephants dislike cats, so she figured that the indirect approach would be safer. She told her problem to a friendly mare which had the run of the pasture where the elephants were led to drink. Being an old trooper herself, this horse knew it would be a cinch to stampede Siam into the mountains where the cat more readily could make her appeal.

Not until Siam stopped at the top of the mountain did the cat speak.

"Maa, na gleat (my, what an ugly one)!" she purred from a limb almost in Siam's ear.

The elephant gave a great start and began to gurgle in her throat—a sure sign of pachydermatic pleasure. Lo and behold, here was a genuine fellow Siamese with a high compliment. For had the cat called the elephant a pretty one, the attention of evil spirits surely would be aroused. An hour later, the elephant pulled the rock away and the cat brought her hungry kittens forth for inspection.

"Maa," said Siam, "na nu (what rats)!"

The cat purred at the elephant's returned compliment.

The cat learned that Siam was born on Doi Sutep, a jungle mountain near Thailand's northern border; that with her mother she was captured with 50 other wild ones in a stockade after a week-long drive; that tame elephants helped domesticate the whole bunch within seven weeks; that nearly all circus elephants are cows, caught wild when younsters in India, Burma and Thailand (Siam) and taken from their mothers after weaning at four; that an adult elephant has the strength of 16 oxen; that the normal work expectancy of an elephant is 50 years and that the slightest bit of frost gives them stomach cramps.

This last bit of information was of deep concern. Already Siam had 'em. She longed for the comforts of home. But, she confided, she still had one great ambition as long as she was on the loose. It was to dance—the thing every wild elephant wants to do sooner or later, as every wise mahout will attest.

In the jungle, Siam explained, the trumpeting and thumping of the wild herd makes the music and excites the action. But sometimes, she said, they respond to the strange distant notes of *kan*, the many-stemmed bamboo flute of the Laos tribesmen. If she could hear music, the elephant said, she might get up enough steam to dance—and then she'd give up.

The cat, herself, had been imported from Chieng Mai and she knew a *kan* when she heard one. And happily she recalled that on a certain peak to the north-east a big white pine gave off during a south wind an almost exact duplication of notes. So off they went with the kittens clinging to folds on top of Siam's neck and the cat leading the way around crevices in the rock, because elephant's can't jump or step across ditches more than six feet wide.

Well, sir, there was a fine dancing spot next to the pine. Finally the wind started up and the pine's branches moaned and whistled exactly like the *kan*. Siam lifted her trunk joyously and began to dance. And the cat danced. And so did a gallery full of deer. It was *simply* a ball! Siam's samba almost collapsed a Catskill.

"Let's call it a Siamba," shouted the cat.

They screamed words to the tune.

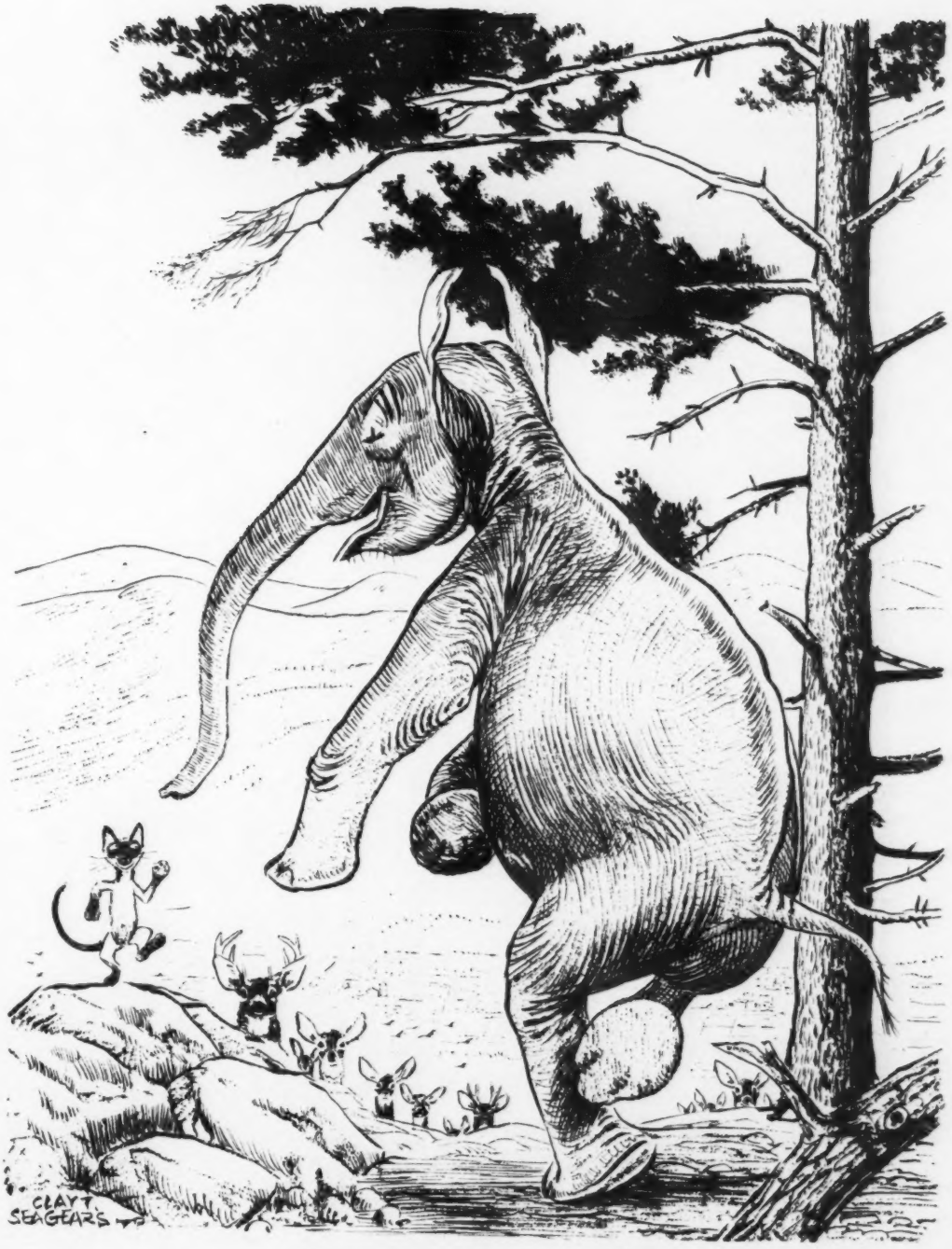
When the wind died down, the whole bunch lay around absolutely exhausted. Finally, Siam lurched happily to her feet, said goodbye and padded away to give herself up. That's how it was.

This holiday time, the dance bands at the Catskill resorts are pounding out the strange beat of a brand new song. All the cats say it's the biggest thing in years. The drummer who first wrote it down swears it suddenly came to him out of thin air.

And now for Question 22 regarding how to avoid burns caused by grabbing a loose elephant rope: merely first repeat loudly and clearly the opening line of that new Siamba song—

"O wah tan aa-Siam."

—Clayt Seagears



Siam's samba almost collapsed a Catskill

"FOREST SHADOWS"

The white-footed mouse is one of the rodents often taken by owls as food. The mushroom is Amanita caesarea